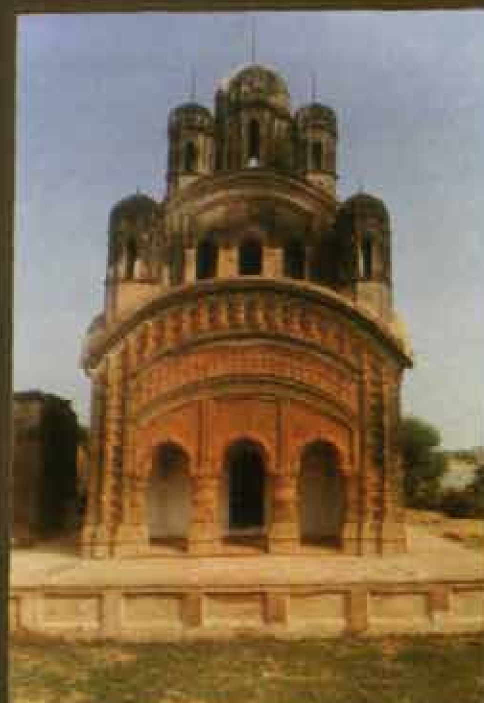
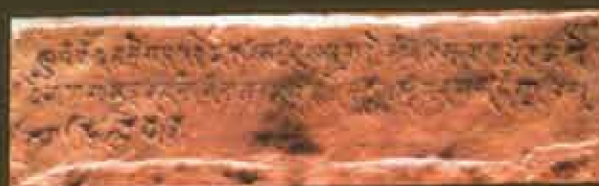
Indian Archaeology

1999 - 2000 **A Review**









INDIAN ARCHAEOLOGY 1999-2000 -A REVIEW



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Back Cover: *Sirpur: Siva temple, view from north*

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PREFACE

This issue of **Indian Archaeology 1999-2000 — A Review** is the forty-seventh in number which incorporates the reports of various field works undertaken in the country by the officers of the Survey, State Governments, Universities, Research Institutions and Museums. The issue contains the reports on excavations, explorations, epigraphy and numismatics, palaeobotanical studies, museums, structural and chemical conservation of monuments, horticultural activities and publications. For all these material, I am grateful to the contributors.

I express my thanks to Dr. G.C. Chauley and Dr. B.R. Mani, Directors (Publication) for their co-operation.

I would also like to place on record my deep appreciation for the hard work done by the entire team of Publication Section in compilation, editing, proof reading, besides making this issue press-ready for its final printing. For this work my special thanks are due to Dr. (Miss) Arundhati Banerji, Superintending Archaeologist (Publication), Shri Hoshiar Singh, Production Officer, Dr. Piyush Bhatt and Shri Gunjan Kr. Srivastava, Assistant Archaeologists and all the other staff members of the Publication Section. I also thank Sh. Vijay Kumar, Chief Artist, Sh. Rakesh Chandar, Sr. Artist, Shri Kishan Singh, Sr. Draftsman, Shri Baldev Singh, Draftsman Gr.II, Shri Kewal Singh, Surveyor Gr.I for their support in improving the line drawings wherever needed.

I would appreciate and thank Mrs. & Mr. Veerendra Kumar Malik of M/s. Veerendra Printers, 2216, Hardhian Singh Road, Karol Bagh, New Delhi for composing, layout, designing and printing of this issue.

New Delhi
08-07-2005

(C. Babu Rajeev)
Director General

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INDIAN ARCHAEOLOGY 1999-2000-A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ASSAM

1. EXCAVATION AT SURYA PAHAR, DISTRICT GOALPARA

In continuation of the earlier work {*Indian Archaeology 1997-98 - A Review,* pp.5-6)[1], Excavation Branch - III, Patna, in collaboration with the Guwahati Circle, of the Archaeological Survey of India[2] carried out excavation at the site, under the joint directorship of G.C. Chawley and Muhammed K.K., assisted by D.K. Ambastha, N.K. Sinha, S.P. Gupta, T.K. Srivastava and O.P. Pandey.

Surya-Pahar is situated about 140 km west of Guwahati in Goalpara. As reflected by its name it is a mountain with a rock-cut sculpture of Surya (Sun God), carved on a boulder, now kept in a modern unfinished temple, being constructed over the remains of ancient one. Besides the Surya image, other deities of Hinduism and Jainism are also carved. A few boulders have been given the shape of *Siva-Iinga* and votive stupa.

Surya-Pahar is enclosed by River Brahmaputra in north and by Meghalaya State in south. Kamroop district lies east of Surya-Pahar while Dhuburi district encloses it from the west and the River Brahmaputra flows about 1 km north of this site.

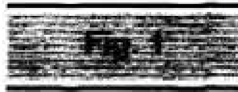
The mound is locally known as Dasabhuja after a multi-armed sculpture carved near the mound over a huge boulder. But actually this rock-cut sculpture is of Visvarupa Vishnu having twelve hands.

This year's excavation was carried out with the two main objectives: (a) to trace the complete plan of the structure buried under the mound and (b) to establish complete cultural sequence of the site.

Trenches were laid out in horizontal pattern and attempts have been made to trace the extension of the partly exposed structures (fig. 1).

In the course of excavation, the remains of a brick temple having a sanctum *(garbhagriha)* and a porch *(mandapa)* enclosed within an enclosure wall (pls. 1 -2) constructed directly over natural soil was unearthed. Though the evidence of atleast two

[1] This publication is referred to in the following pages by the year only.
[2]Archaeological Survey of India is referred to in the following pages as the Survev only.



KEY PLAN OF EXCAVATED REMAINS AT SURYA PAHAR (SPR-1) DISTRICT-GOALPARA, ASSAM YEAR 1999-2000

10 0 10 METRES

XA 2 XA 1 A 1 A 2 A 3 A 4 A 5

XB 2 XB 1 B 1 B 4 B 5

TEMPLE 1

ENTRANCE

TEMPLE 2

XC 2 XC 1 C 5

MANDAPA

XD 2 D 3 D 4 D 5

GARBHA GRIHA

XE 2 XE 1 E 2 E 3 E 4 E 5

XF 2 XF 1 F 1 F 2 F 3 F 4 F 5

XG 2 XG 1 G 1 G 2 G 3 G 4 G 5

Plates 1-2

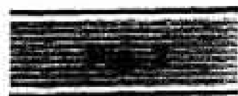


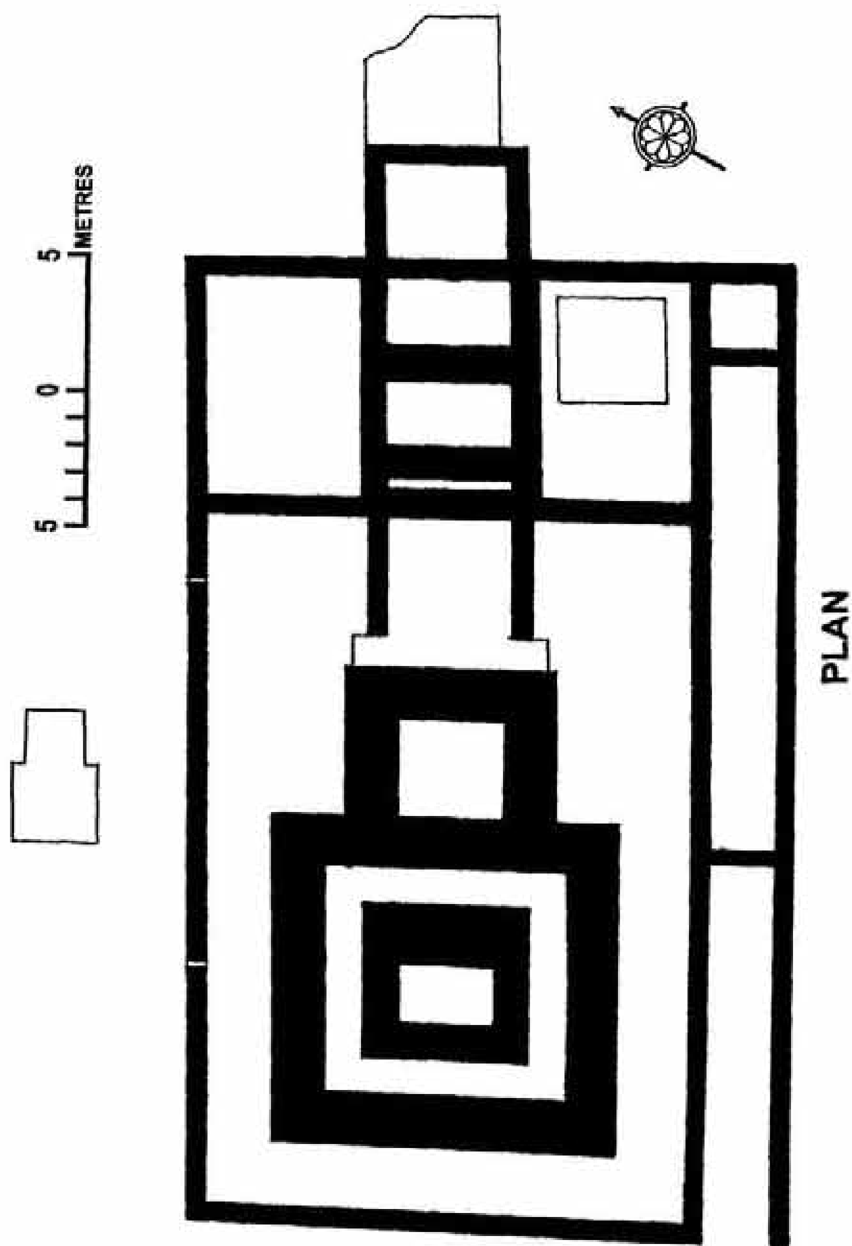
1



2

Surya Pahar : 1, *general view of excavation and* 2, *exposed section and enclosure wall*




TEMPLE - 1, SURYA PAHAR GOALPARA - ASSAM
5 0 5 METRES
PLAN

constructional phases were identified, the temple was constructed during later Gupta period or early medieval period (fig.2).

The sanctum *(garbhagriha)* of this temple is roughly 8x8 m square. The wall of the sanctum is 2 m wide. The entrance is provided from north-east direction. The northern wall of the sanctum is considerably robbed with traces of only three courses but the walls of western and southern sides are preserved upto eight and fifteen courses respectively. The southeastern corner, from outside the *garbhagirha* is comparatively better preserved. Among its fifteen courses, lower three serve as foundation, the fourth course is *in situ* and upper four courses are out-of-plumb. In upper six courses, cavities were noticed at regular intervals which were identified as niches for decorating the outer wall by fixing terracotta plaques in it. The remains of a *chandrashila* was found on the northern wall of the sanctum. A square platform measuring 4.25 X 4.25m was noticed in the centre of the *garbhagriha.* The square platform is made of 1.80m wide brick wall of which core is filled with earth. This platform is having fourteen courses of bricks. Probably the presiding deity of the temple would have been installed over this platform (pl.3).

In front of the *garbhagriha,* the remains of a rectangular *mandapa* was exposed, which measures 3.70 X 2.5m. The northern and southern wall of this *mandapa* is 2.20 m wide, while eastern wall is 1.60 m thick. The western wall of the *mandapa* is 1 m wide and *garbhagriha* is connected to this *mandapa* through this wall (pl.4). Northern wall is having maximum twenty courses of bricks while southern wall is having fifteen courses. There is evidence of niches in the outer southern wall of *mandapa* also. Fragments of terracotta plaques found from the debris suggests that outer wall of both *garbhagriha* and *mandapa* were well decorated with these plaques. From outside, the shape of the *mandapa* is square and there is no provision for *antarala* in-between *garbhagriha* and *mandapa.*

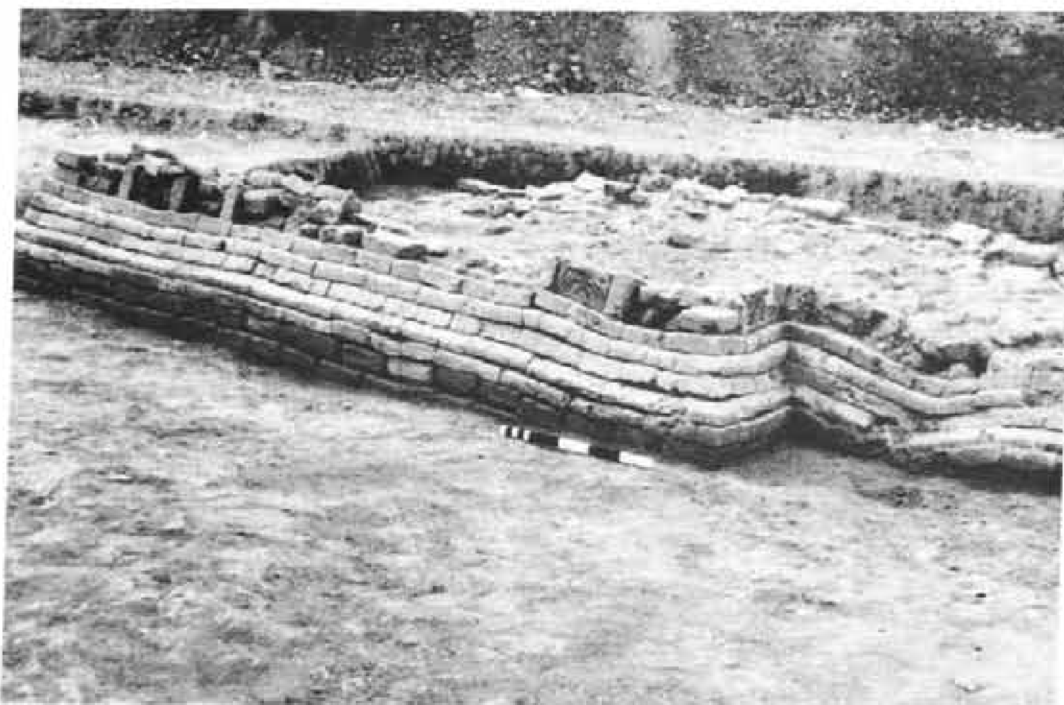
From *mandapa* to the main entrance, the evidence of a 5 m wide pathway was found, badly damaged by construction of a few brick structures during the next phase. One small room measuring 4.35 X 2.65m was exposed near the entrance inside the enclosure wall. Another room of 5.40 X 3.60m was traced at the entrance but outside the enclosure wall. Most probably these two rooms were perhaps open from all sides but having a roof over it. It seems that these two covered spaces, open from sides were provided for functionally polyvalent use of the temple.

A few other structures were also traced within the enclosure wall, the contour of which is yet to be emerged. In the south-east corner of the enclosure wall, the remains of separate room measuring 2 X 2m were also found. The thickness of the wall of this room is 1.25m with five courses of bricks. Another 70 cm wide wall having eleven courses of brick was found joining southern enclosure wall and pathway.

The entire area inside the enclosure wall is brick paved but the pavement is missing at places.

In the north-west direction of this temple, outside the enclosure wall, another small shrine was also exposed. The size of the sanctum of this temple is 3.10 X 3.10m and entrance is 2.15 X 2.15m. The remains of this small shrine was found upto the height of 50 cm with seven courses of bricks. Lower three courses are plain, and from the seventh course, provision of niches was noticed at a

Plates 3-4



3



4

Surya Pahar: 3, view of exposed temple and 4, outer wall of garbhagriha and mandapa

Plate 5



Surya Pahar: fragments of terracotta plaques

Plates 6-8



6



7



8

Surya Pahar: 6-7, terracotta kirttimukha and 8, fragmentary head of Vishnu (?) in stone

regular interval. Some *in situ* terracotta plaques were also found in this small temple. This temple might have been constructed for the consort of the main deity.

Perhaps the whole complex was within a second enclosure wall because the remains of another 70 cm wide wall was traced in the southern side of the site upto a length of 36 m.

The bricks used for the construction of all these structures are 41 X 21 X 7 cm and 42 X 22 X 7 cm in size.

Among the antiquities, fragments of terracotta plaque depicting decorative designs (pl.5), different types of *kirttimukhas* (pls. 6-7) and head of a deity probably of Vishnu in stone were recovered (pl.8).

2. EXCAVATION AT AMBARI, DISTRICT KAMRUP

The excavation at Ambari was resumed under the direction of R.C. Das, co-cordinated by N. H. Dutta, R. D. Kauli, of the Directorate of Archaeology, Government of Assam.

Two trenches measuring 6x6 m, were opened for systematic excavation. Trench AMB 11B exposed a brick wall, structure No. 1, laid in north-south alignment. This wall measures 4.30 m in length, 1.55 m in width and 0.55 m in depth. There are ten courses of bricks in the northern part. The wall rested on layer (4) at a depth of 1.40 m. Upon the southern part of this structure two fragments of stone measuring 78 X 11 X 17 cm and 50 X 30 X 25 cm were found placed horizontally. Upon this wall a part of brick floor exposed at southern end. This brick floor laid in east-west direction measures 2.60 X 0.80 X 0.12 m. The courses of bricks of this floor is neatly laid. The floor with horizontal diversions, marked by bricks, laid vertically at regular interval. This floor was exposed in the adjacent Trench AMB 11 A. Evidence of two large storage-jars measuring 0.40 m and 0.49 m in diameter exposed in part with natural soil exposed in layer (51.

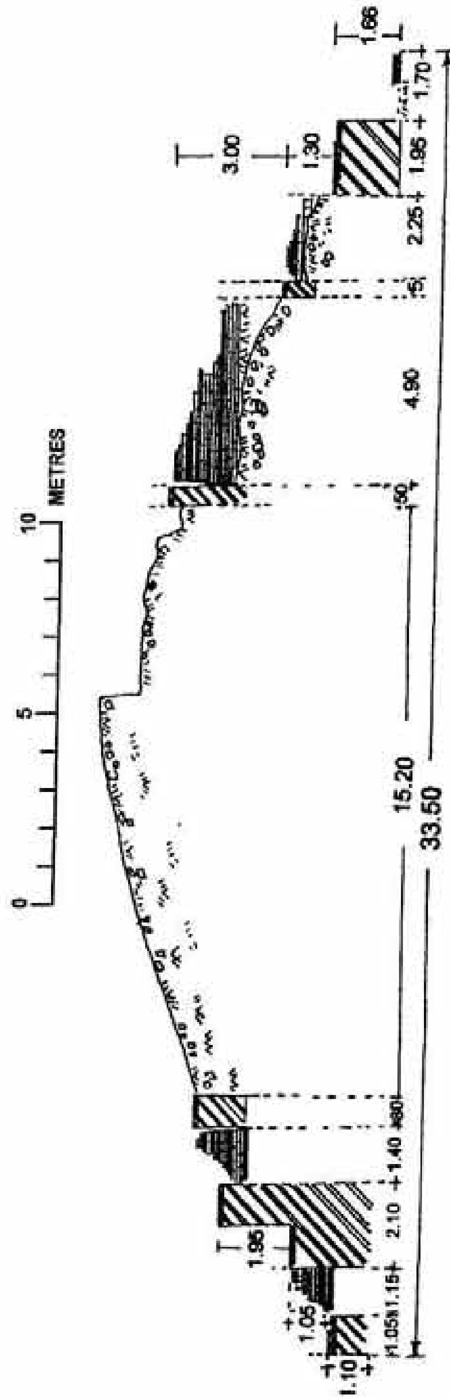
Trench AMB 11 B exposed a brick floor in east-west direction. It measures 1.50 m in length. 0.44 m in width and 0.4 m in thickness. These brick structures rested on layer 3a. Another brick floor in north-south direction measuring 5 m in length. 1.10m in width and 0.34 m in thickness was exposed in layer 3a. A soiling of brick measuring 1 m in length and 60 m in width was exposed in the north-east part. A stone boulder (0.59 X 0.40 X 10 m) was found upon this floor. There is a pit (1.35 m in dia) with Kaolin pots and terracottas besides globular bodied small pots decorated with applique designs, elongated pots and large storage-jars with flayered rim.

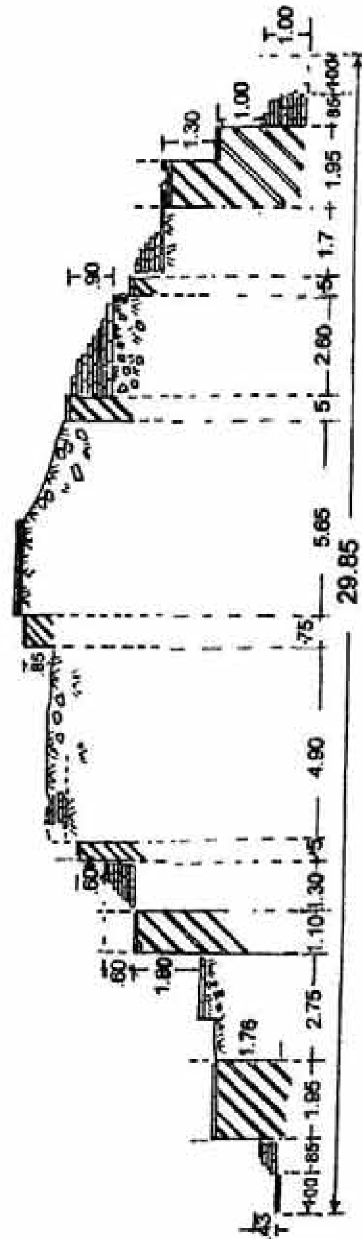
BIHAR

3. EXCAVATION AT KESARIYA, DISTRICT EAST CHAMPARAN

In continuation of the last season's work *(1998-99,* pp.2-3). Patna Circle, of the Survey, resumed excavation at Kesariya under the guidance of Muhammed K.K.. assisted by T.J. Alone. D.P. Sinha, A.K. Pandey. K.C. Srivastava. D.N. Sinha. B. Gartia. M.P. Singh. Avinash Kumar and Rajnish Raj.

At the northern face of the mound altogether twenty-two trenches including thirteen unfinished ones of the last season were subjected to excavation with a view to exposing all the terraces and the drum of the stupa atop in one strip. Upto the third rise, the cells and the decorative pattern are


VANGANGA (RAJGIR) DISTRICT NALANDA, BIHAR
(1999-2000)
0
5
10
METRES
15.20
33.50
4.90
SECTION ACROSS EAST - WEST


5.65
29.85
4.90
2.60
1.95
SECTION ACROSS SOUTH - NORTH

similar to those revealed in earlier excavation and seem to be constructed in eight directions whereas the fourth and fifth rise have the cells in four cardinal directions only. The fourth rise with one central cell is flanked by two smaller side cells. The number of cell in the fifth rise is only one in four cardinal directions probably due to paucity of space in the reduced perimeter of upper terraces. Atop the fifth terrace rises the stupa to a height of 9.38 meters having a dia of about 22 meters and traces of *ayaka* projection in four cardinal directions. A major repair work to the drum portion during the British period with bricks measuring 20 X 10 X 5 cm were noticed. Remains of lime-plaster on the drum of the stupa and on the floor of the *pradakshina-patha* was also noticed. During the clearance of earth at the bottom level four to five courses of three cells in the alignment of the cells on all five terraces were traced over a rammed floor, 4.5 m beyond the base circle. Although these seem to be later addition to the main structure but it is a significant evidence of another terrace further below. This could be confirmed only after further excavations.

A good number of beautifully carved and cut bricks showing geometric and floral patterns, *kirttimukhas,* brick tiles, a copper arrow-head, sherds of stamped-pottery, miniature pot, lid-cum-pot, red ware sherds of vases and bowls, spouts etc., were recovered from the excavation.

4. Excavation at Rajgir, District Nalanda

Excavation Branch III, Patna, of the Survey, under the direction of Muhammed K.K., assisted by D.K. Ambastha, D.K. Singh, N.K. Sinha, J.K. Tiwari, S.P. Gupta and O.P. Pandey, undertook excavation at Rajgir situated at a distance of 6 km south from Rajgir bus stand between the vallies of Sonagiri and Udaygiri hills. The site proposed for the excavation is on the left side of the road when one proceeds from Rajgir towards Gaya.

The mound is 200 m north from the south-western gate of the ancient Rajgir and 100 m south of the chariot wheel marks and shell inscriptions. The southwestern opening at ancient fortified city is located 200 m south of the mound and rut marks of chariots and shell inscriptions found on a rocky ground is just 100 m north of this site.

The extensive mound has a diameter of about 40 m at the base and rises to a height of 6.5 m above the surrounding plain. The mound was taken up for excavation to establish cultural sequence of the mound and to know architectural pattern of the structures.

The excavation has so far exposed three deposits of which the sealing layer is reddish brown in colour containing brickbats, stone rubbles, tiny potsherds and rootlets (fig. 3). The maximum thickness of the deposit is about 70 cm. The thickness of second deposit varies upto 56 cm which is encountered only in a limited area. This deposit is grey in colour and contains less brickbats and more potsherds. The third deposit made of ashy colour with maximum thickness of 67 cm contains less brickbats and very good number of potsherds.

The entire range of pottery is made on fast rotating wheel marked by (i) red ware (ii) grey ware (iii) NBPW and (iv) Kaolin ware.

The shreds of red ware stands highest in percentage. The fabric ranges from coarse-to-medium, well-fired and devoid of any surface treatment. But in the case of storage-jars it is found that they are ill-fired showing unoxydised smoky mid section.

Plates 9-10



9



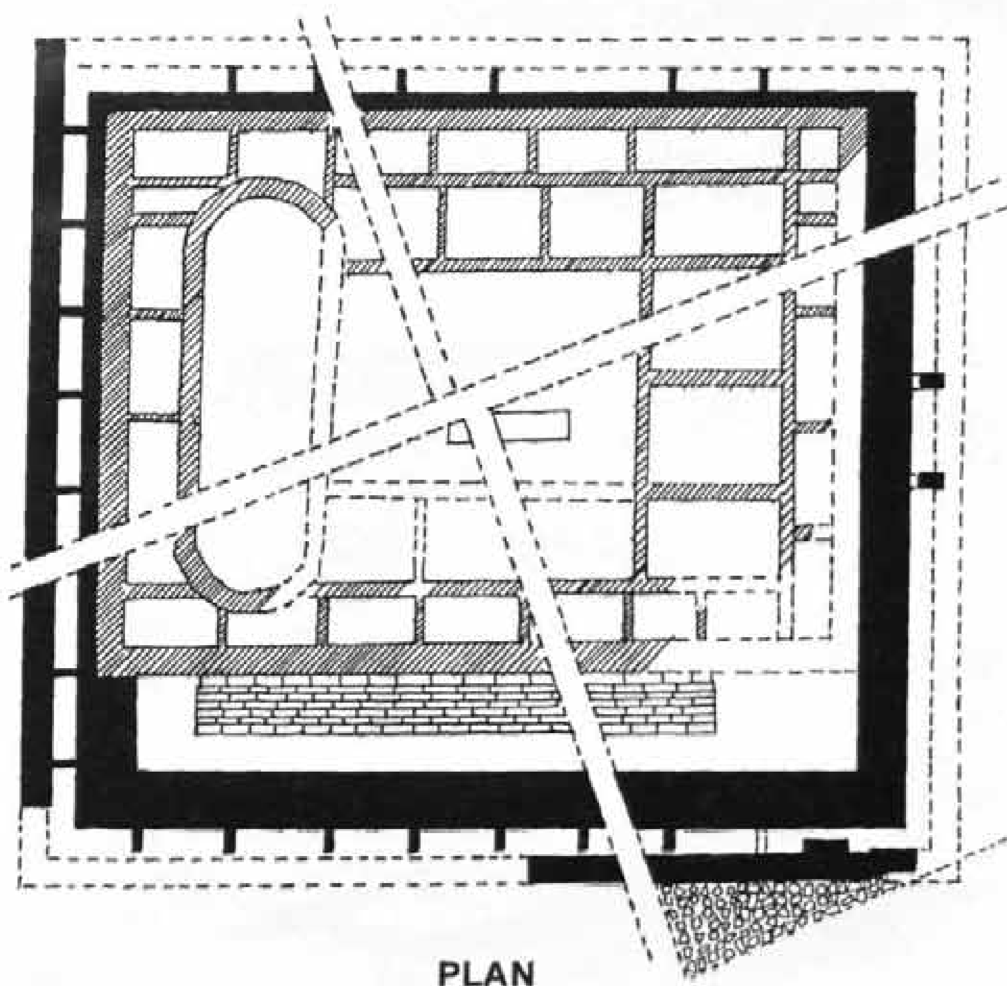
10

Rajgir: 9, exposed stupa, view from north and 10, exposed stupa with buttresses, view form south-west

Fig. 4

EXCAVATED REMAINS AT VANGANGA (RAJGIR)
DISTRICT - NALANDA, BIHAR (1999-2000)





PLAN

Plates 11-12



11



12

Rajgir: 11, *exposed stupa, view from north-east and* 12, *stupa with apsidal structure, view form north-west*

The types include vases, bowls, lid-cum-bowl and storage-jars. Vases are of different sizes with out-turned thickened rim, oblique shoulder and globular body. Bowls are with featureless rim, incurved sides and ring cut base. Storage-jars are with heavy thickened rim showing unoxidised smoky mid section. A double spouted miniature pot is a noteworthy find of red ware group.

Grey ware stands second in percentage. It is of medium fabric and well-fired. Only bowl and dishes are available in this ware.

NBP Ware stands third in percentage. It is of degenerated variety, of well levigated clay are well-fired having a metallic sound and of thicker variety with golden, black and silver shades. As usual with NBPW, only bowls and dishes have registered their presence.

In Kaolin ware only sprinklers and spouts are the pronounced types of this group of ware, i.e., sprinkler and spout.

The excavation laid bare the remains of a terraced brick stupa (pl. 9), the lower terrace measures 29 X 25 m. The height of this terrace is 1.96m with twenty-eight courses of bricks. The terrace is provided with buttress walls at almost regular intervals of 1.95 m to 3 m. The dimension of buttresses is 90 X 26 cm with two to thirteen courses of bricks (fig. 4, pi. 10).

In the lower terrace in the eastern side, the evidence of a robber's trench was noticed. This was filled by stone rubbles over which were constructed the brick chambers.

Just above the lower terrace, the second terrace was exposed. The southern side of this terrace is provided with 5 cm thick lime-concrete plaster. Probably the remains of a brick-paved *pradakshina-patha* was also traced in the southern side on the second terrace.

The upper terrace is formed of brick chambers (pl. 11), filled with stone rubbles and earth, the measurement of which varies from 3.1 X 1 m, 3.25 X 1.5 m, 4.7 X 3.7 m, 4.7 X 2.4 m. On the western side, an apsidal brick structure (pi. 12) measuring 13.2 X 2.4 m similar to the one found in *Jivakamravana* was noticed. The brick sizes of the stupa are 52 X 25 X 7 cm, 52 X 26 X 8 cm, 51 X 26 X 8 cm, 52 X 26 X 8 cm, 43 X 23 X 7 cm and 42 X 27 X 6 cm.

Among the antiquities recovered during the excavation, mention may be made of *ghata*-shaped terracotta beads and agate bead, copper antimony rod, fragments of terracotta bangle.

5. EXPLORATION IN DISTRICT PALAMAU

N.K. Sinha and O.P. Pandey of the Excavation Branch-Ill, Patna, of the Survey, discovered a multicultural site called Kabra-Kala based on the information from Tapas Kumar Dey, a local resident of Japala. Situated on the confluence of Rivers Son and Koel, village Kabra-Kala (83° 56' 15" N and 24° 31' 30" E) lies under Haider Nagar Police Station in Japala block of District Palamau.

The village Kabra-Kala is situated over a huge mound. There is no habitation in the eastern part of the mound as the area was cultivated by the villagers.

The mound was explored thoroughly at different places and the surface finds clearly indicate an ancient settlement starting from neolithic to late medieval period.

Pottery picked up from the site include lipped-bowl of Chalcolithic period, NBPW with

golden and silver shades, black-slipped ware, dull grey and dull red ware.

Polished and ground stone axes, a terracotta figurine of dog having incised eyes, pieces of glass bangles, *ghata*-shaped bead of terracotta, barrel-shaped bead of crystal, both comparable to Hastinapura III, legged-querns, pestle, metal vases of late medieval period are the main antiquities of this site. Ring-wells of different diameter varying from 68 cm, 74 cm, 77 cm, 126 cm and 130 cm were also traced.

Explored material indicate its importance as an establishment on the water routes connected with the ancient Pataliputra and Malwa.

6. Excavation at Hella Bazpur, District Vaishali

The Department of Ancient Indian History and Archaeology, Patna University, Patna, carried out trial-excavation at Hella Bazar about 1 km northwest of Masjid Chauk near Hazipur township in District Vaishali, under the direction of A.K. Singh, assisted by N.K. Arya, J.H. Pandit and P.K. Bose.

The main objective of this year's excavation was to ascertain the cultural sequence in the area close to northwestern side of the Hazipur township. Keeping in view, the above objective, two trenches, each measuring 6 X 4 m were laid out towards the western side of the Badi Sangat. The trenches laid out in north-south orientation were christened as HLB-IA and HLB-I B.

Excavation in this area revealed 3.60 m thick habitation deposit divisible into five layers. Layer (1) is represented by humus with a thickness of 0.25 m while layer (2) characterized by the mixed materials such as fragments of green glazed ware of early medieval period. Layers (3) to (5) belong to the Kushan period. The layer (3) is marked by somewhat loose soil deposit of having a thickness around 0.90 m while layer (4) is characterized by loose soil deposits of greyish colour mixed with brickbats having a thickness of about 1.05 m. The layer (5) is represented by brick line consisting of broken bricks running into the section which is associated with a small portion of a *surkhi* beaten floor in the northwestern corner of the trench. The pottery recovered from the above three layers ranging from layers (3) to (5) include mainly plain red ware, slipped-red ware and some fragments of polished red ware. The antiquities associated with pottery consist of iron pieces, copper pendant and bangle, a good number of terracotta animal figurines, one or two terracotta human figurines, head of a *nagi* figure, skin rubber, wheels, whistle, bead; bone dice and circular stone weight. The animal figurines are more commonly found showing figures of horse with saddle, dog, wolf, etc. A miniature pot bearing holes in the body of the pot is of special interest.

The lowermost deposits in both the trenches ranging from layers (6) to (7) are characterized by thick silt deposit having a thickness of 2.00 m, but without any habitational remains.

GOA

7. Exploration at Devgali, Zamba, Bicholim, North Goa

The team consisting of J.V.P. Rao, Manoj Saxena, Siriguru Bagi, Gangadhar Korgaonkar, Gopal Rao, of the Mini Circle, Goa and Rajendra Kerkar, a local lecturer, explored two rock-boulders with *linga* on pedestal within rock-cut niche in one of the cashew nut plantations. The first rock-cut shrine measures 63 X 85 X 100 cm while *linga*

measures 11 cm in diameter and 31 cm in height carved on a pedestal, 20 cm high which is carved on the back wall of the niche or shrine. The other rock-cut shrine carved on another laterite rock-boulder in the vicinity of previous one measures 106x122x88 cm and *linga* measures 5 cm in diameter and 30 cm in height placed on 28 cm high pedestal.

8. EXPLORATION AT KERI, BICHOLIM, NORTH GOA

A team consisting of Manoj Saxena, Sriguru Bagi, Gopal Rao of the Mini Circle, Goa, of the Survey and Rajendra Kerkar, a local lecturer, explored a medieval temple in thick forest along with twenty-six sculptures. The temple is in ruins and superstructure is completely missing except one or two pillars. This temple is made of laterite stone masonry, available locally. The structure mainly belongs to the seventeenth century and enshrined by a local deity called Ravalnath, Mahishasuramardini.

9. EXPLORATION AT VARPAL HATURLI, KUSKECHI RAAN, BICHOLIM, NORTH GOA

J.V.P. Rao along with Manoj Saxena, Siriguru Bagi, Gangadhar Korgaonkar, Gopal Rao, of the Mini Circle, Goa and Rajendra Kerkar, a local lecturer explored a rock-cut cave, excavated in laterite rock at 88 cm height from the ground level. The cave measures 347 cm (width), 2.47 cm (depth) and 182 cm (height). The cave is supported by two pillars making three bays having a porch in front measuring 3.47 X 165 cm. The central bay is enshrined by a rock-cut cylindrical *Siva-linga* (measuring 38 cm height and having 107 cm circumference) upon *in situ* rock-cut laterite pedestal (measuring 75 X 75 and 80 cm height) with *pranala*. This cave recalls the rock-cut caves carved by the Chalukyas of Badami with a typical massive cylindrical *linga*.

10. EXCAVATION AT ST.AUGUSTINE'S CHURCH, OLD GOA, DISTRICT NORTH GOA

In continuation of the previous year *{1998-99,* p.4), the Mini Circle, Goa, of the Survey, under J.V.P. Rao, assisted by Manoj Saxena, Sriguru K. Bagi, G.K. Korgoankar, and V. Gopal Rao carried out excavation and conservation of the excavated remains of the church of our lady of Grace popularly known as St. Augustine church-complex at Holy hill, Old Goa.

The chapel lying south of the main church was taken up for scientific clearance and *in situ* collapsed debris measuring 6.00 X 7.40 X 3.50 m was cleared. During the clearance work, the stone bench built of basalt laid on either end of the paved floor is still extending towards north, i.e., alter side. Besides there are also separate stone seat built in the wall found extended towards the north.

The small finds like Chinese ceramic and two copper alloy Portuguese coins were recovered from the dig.

A mound in the middle of Chandor Cotta, houses the remains of an eleventh century Siva temple which is also known as 'Isvorachem'. The temple site at Chandor Cotta was previously excavated on two occasions, once in the 1930s by Rev.Fr.Heras of the Xavier Institute of History and Culture, Bombay and later by the Survey under S.R.Rao, during 1974 season which brought to light a brick temple consisting of *garbhagriha* surrounded by *pradakshina-patha,* a large *sabha-mandapa* and a medium-sized *mukha-mandapa* or porch. The temple faces east and measures 16.40 m (east-west) and 14.10m (north-south). With a view to locate the earlier phases of construction, the excavation was carried out during the year under review which unearthed two major phases

of construction along with a number of later alterations ascribable to the second phase, which are grouped together as phase III.

The building of phase-I shows a rectangle measuring 20.92 m north-south and 10.40 m east-west with two 7.3 m wide rectangular transepts extending about 3 m from the centre of each of he long walls (cruciform). Only the foundation courses of the phase I building are now preserved besides remains of fourteen pillar bases. The extant pillar bases are arranged into two rows of six with a further two being located within the western transept. The pillar bases relate perfectly symmetrically to the plan of the phase I building.

The phase-H consists of a squarish *mandapa* measuring 12.38 north-south and 14.62 m east-west inside with a small *garbhagriha* which protrudes 1.37 m from the middle of the eastern wall and measures 2.38 m north-south by 1.41 m east-west in the interior. The extant *adhishthana* mouldings could be seen on the southern side *mandapa* wall.

In phase IIB rectangular structure was added to the east of the temple surrounding *garbhagriha* of phase II A. It was constructed completely different from previous walls having roughly dressed laterite block as foundation course.

The basic phase II B building remains in use in phase III for as long as the site was the temple. A crudely constructed and badly preserved square brick structure is located in the centre of the western part of the phase II building. This was identified as *garbhagriha.* The structure was built on silt and brick rubbles above the *mandapa* level, i.e., phase II A. Hence, this structure belongs to later stage than that of the phase II walls, identified as western shrine.

To the east of the temple, a stone *nandi* stands, now surrounded by modern stone wall. This is said to have been removed from the ditch of western shrine of phase III. This sculpture could be stylistically dated to the eleventh century AD. Towards further east *of nandi* sculpture, in the present season, excavations revealed a broad brick wall running in north-south direction and was traced to a length of about 9.25 m with a width of 1.28 m having six extant courses of bricks laid in mud mortar. The bricks measure 28-31 cm x 14-18 cm x 6-7 cm. The continuation of this wall is not found due to the intervention of the late phase brick walls which overlie it. However, a similar brick wall with same width and same sizes of the bricks is found again at a distance of 15 m from here (from 9.25 m) in test pit T. From test pit 'J' in grid co-ordinates 2038.40/2022 to 2038.40/2015 this wall is preserved partly upto a distance of 5.10 m from north-to-south. From here the wall is missing for a distance of 4.26 m further south due to robbers cut leaving the end of the wall at 9.36 m from Test Pit 'J'. The end of the wall is marked by five extant brick courses having 0.70 m length and 20 cm in thickness, cut irregularly from top to bottom, leaving remnants of the wall. This was built of the same brick sizes used in first phase of the temple site. This wall appears to be a city wall which is yet to be probed on either ends.

Test pits PG I, PG II and PG III were laid on the west, north-west of the temple site to trace the extension of the cultural activity.. PG I was dug upto the natural soil while PG II was abandoned after digging the surface layer. The PG III has revealed a rectangular brick platform.

The PG I was dug upto a depth of 3.74 m exposing ten deposits laid over the natural surface. The deposits are mainly characterized by dumps

of pottery, tiles, often mixed with charcoal and ash. The pottery and tiles can be datable to early medieval times. The deposits are dipping towards south-west indicating that the profile of the mound at western side is having gentle slope while on the eastern side forming like a mound where the temples were located.

The PG III revealed a rectangular brick platform oriented in 30° north-east and south-west direction. It measures 1.46 m in length by 1.10 m in width with one extant course having a circular post-hole towards northern side. The sizes of bricks indicate this platform belonged to the first phase of the temple site.

The suggested date of the phase I structure is between third and seventh century based upon pottery to have been found by previous excavators and *adhishthana* mouldings of phase II structure which overlies it. Cruciform temples are known from eleventh century onward in Hindu and Jaina traditions, but it is not known from anywhere in South Asia from such an early date. The phase II structure represents a much better known temple plan. It can be approximately dated, from the *adhishthana* moulding to seventh century. The phase III structure points to the later medieval changes made to the building probably in the period between the eighth and the thirteenth century. The presence of *nandi* makes it certainly a Siva temple datable to the eleventh century.

11. EXPLORATION AT BHUIPAL, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao, along with his team and Rajendra Kerkar a local Lecturer, Goa, located a hero-stone with five panels at a place by the side of the road about 8 km away from Valpoi. It bears inscription in Kannada script belonging to the Vijayanagara times.

12. EXPLORATION AT CARANZOL, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao, along with Manoj Saxena, Siriguru Bagi, Gangadhar Korgaonkar, Gopal Rao, Prakash Gaonkar, explored Village Caranzol, north of Valpoi situated at the foothill with remains of laterite temple. The two temples, stand on the ancient *adhishthana,* are under worship. During the course of exploration ga/a-Lakshmi panels and fragments of Brahmani Mayadevi sculptures were found.

13. EXPLORATION AT CHARAVENDEM, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao along with his team and Rajendra Kerkar a local lecturer, explored the village which is situated at the northeastern part of the Satteri taluka, 14 km away from the Valpoi town. The important features in this village are stone circles and a new temple built on an ancient *adhishthana.* A *gaja*-Lakshmi panel was also discovered at this place.

14. EXPLORATION AT DABEM, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, under J.V.P Rao of the Survey, assisted by Manoj Saxena, Sriguru Bagi, Gangadhar Korgaonkar, Gopal Rao and Prakash Gaonkar explored this village where an ancient Siva temple was located but the entire superstructure was renovated. The loose sculptures of Ravalnath and Sateri Kelbai of local god and goddesses could be found here datable to the seventeenth-eighteenth century.

15. EXPLORATION AT MAUXI, SATTERI, DISTRICT NORTH GOA

J.V.P. Rao of the Mini Circle, Goa, of the

Survey, assisted by Manoj Saxena, Sriguru Bagi, Gangadhar Korgaonkar, Gopal Rao and Prakash Gaonkar explored an early temple, survived upto *adhishthana* level. This temple is enshrined by a *linga* at the centre surrounded by five subsidiary *lingas.*

The team has also discovered one more panel of *gaja-Lakshmi* on basalt stone which was lying in the paddy field near the stream. This panel is bearing the beautiful depiction of Lakshmi in the centre flanked by two elephants on either side, this panel is about 1 m long and 0.50 m wide at the centre. This panel belongs to the seventeenth-eighteenth century and locally known as Khelbai, indicative of Lakshmi. A Bhairava sculpture also noticed in the forecourt of the Satteri Temple in Mauxi which depicts a chain in the neck and a *mundamala,* having a beard and a sword in hand.

16. EXPLORATION AT SANVORDEM, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao and his team explored the village Savordem, 5 km away from south of Valpoi, with remains of Siva temple. It has *linga-pitha* with *linga* and in front of it there is Nandi, on a laterite plinth. In the vicinity of the temple was noticed a large number of loose sculptures of Brahmani Mayadevi, Mahishasuramardini, Ravalnath, *gaja-Lakshmi* panel, etc. besides fragments of various sculptures belonging to the seventeenth-eighteenth century.

17. EXPLORATION AT SONAL CAVES, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao, assisted by Manoj Saxena and Sriguru Bagi, Gangadhar Korgaonkar, Gopal Rao and Prakash Gaonkar discovered three niches excavated into local laterite rock. One of the niches contains a small pedestal, perhaps for keeping an idol for worship.

18. EXPLORATION AT THANK, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, of the Survey, under J.V.P. Rao and his team explored the village Thane which is at the northeastern part of Satteri taluka and noticed a good number of loose sculptures belonging to the late medieval period. These loose sculptures of Ravalnath, *gaja-Lakshmi,* Brahmani Mayadevi, Mahishasuramardini, are installed in a newly built temple. A unique sculpture of a local chief (riding on the horse) was also found besides an images of Vetal.

19. EXPLORATION AT ZORME:, SATTERI, DISTRICT NORTH GOA

The Mini Circle, Goa, under J.V.P Rao, assisted by Manoj Saxena and Sriguru Bagi, Gangadhar, Korgaonkar, Gopal Rao and Prakash Gaonkar, during the course of exploration found three temples in the village, which are under worship. The Mahadeva Temple at Zorme still retains the ancient *adhishthana* of the *mandapa* datable to the sixteenth-seventeenth century depicting the scenes of hunting, fighting of warriors and elephants on the southern and eastern faces of the *adhishthana.* The superstructure having tiled roof appeared to have been a later addition by raising on wooden carved pillars at the central portion. Within the enclosure of wooden pillars enshrines a broken pillar (locally known as *stamba deva* worship). The periphery of the superstructure was supported by modern laterite masonry pillars. The ruins of the late medieval temple was renovated and made use of the available wooden carved pillars in the shrine during recent times.

To the south of this temple, the loose sculptures of *gaja-Lakshmi,* Mahishasuramardini, Sateri Kelbai and Ravalnath (both village deities) were also collected.

Plate 13



Zorme: Gaja-Lakshmi

One of the two other temples also retains similar *adhishthana* with friezes of fighting scenes. There is a gaja-Lakshmi panel (pi. 13) with depiction of *samudramanthana,* datable to the seventeenth-eighteenth century. The other loose sculptures include *sapta-matrikas* which are partly buried behind the temple.

The third temple also has ancient *adhishthana* but without the carved friezes.

GUJARAT

20. EXPLORATION IN DISTRICTS JUNAGADH AND VADODARA

The Excavation Branch V; of the Survey, under the direction of Shubra Pramanik, assisted by Y.S. Rawat, V.H. Parmar, N.B. Soni and Subhash Chand, discovered the following sites during the course of exploration.

Taluk/District	***Site/Village***	***Nature of remains***
Veravel/ Junagadh	Savla Timba (Prabhas Patan) (20° 56' N; 70° 22' E)	Rock-cut cave
-do-	Vajjra Pannat (Hadmatiya) (21° O1'N;7O° 38'E)	Late Harappan, stupa and historical assemblage
Karjan/Vadodara	Vrundavan (20° 07;N;73° 05'E)	Late Harappan

21. EXCAVATION AT DHOLAVIRA, DISTRICT KACHCHH

In continuation of the previous year's work *(1997-98,* pp. 19-22; *1998-99,* pp. 6-7), the excavation was resumed at the Harappan mound under the direction of R.S. Bisht and D.R. Gehlot, assisted by K.C. Nauriyal, Y.S. Rawat, S.S. Parekh, N.K. Pathak, N.A. Saiyed, A.R. Shah, H.R. Rohit, V.H. Parmar, J.B. Makwana, M.B. Shah, D.R. Shah, S.C. Koli, V.S. Rana, A.M. Aghariya and H.R. Lahute with a view to expose further the remains of structures such as reservoirs and also to understand the features of the citadel and middle town areas.

The rock-cut reservoir lying to the south of citadel was further exposed. Though partially exposed, its extent had now been confirmed, which measures 89.50 m in length and 8 m in depth. The breadth of which measures 14.20 m at the top and narrows down to 8.60 m at base. The eastern embankment of the reservoir has been found provided with a flight of steps from northern corner. Fifteen steps of this staircase are available, with each step measuring 1.02 m x 0.30 m with a raise of 0.24 m (pl. 14).

Similarly, the extent of the stone masonry of eastern reservoir had been ascertained by tracing and exposing its southern corner (pl. 15). The north-east corner had already been exposed in the earlier excavation. Oriented in north-south direction, this reservoir measures 73.40 m in length and 25.95 m in width at the bottom with a depth of 7.00 m.

Plates 14-15



14



15

Dholavira: 14, eastern embankment and 15, eastern reservoir

The western as well as the eastern embankments of the reservoir was found badly damaged. This reservoir seems to have been constructed in the beginning of Stage IV A and was in use till the middle phase of Stage V.

In the Citadel, the remaining un-excavated portion of the western half of the Broadway was excavated to an average depth of 1.15 m. At this depth, walls of the houses of Stages VI and VII were exposed. It was observed that while the orientation of rectangular houses of Stage VI was still guided by the orientation of the walls of the preceding stage, thus maintaining an open corridor between the two rows of houses. The circular structures of Stage VII were found laid at random directly upon the open space. Besides at two meter wide lane, branching off from the Broadway and leading towards south and bordering the water storing/bathing tanks from east, was also exposed. Along the eastern side of this lane, a row of rectangular houses of Stage VI has also been partially exposed.

The massive drain at the western end of the ceremonial ground/stadium was further excavated. It was exposed to a length of 55.80 m from its outer end near the south-west corner bastion of the middle town's fortification to the western end of ceremonial ground where a small drain was found connected to it from northeastern direction. It also confirmed that this drain was running underneath 8.45 m to 9.96 m entrance to the ceremonial ground. Near the eastern end of this passage a large potter's kiln which seems to belong to Stage VI was exposed. This kiln is circular on plan and measures 3.50 m in diameter.

A gateway was brought to light near the western end of the massive drain. This gateway was located to the southern wall of the middle town near the southern corner of fortification of middle town. The floor of the 2.80 m wide gate was found paved with large stone slabs and some of them bear rut-marks of vehicles, probably of handcarts? The rut-marks separated by 1.10 m indicate that the same was the distance between the wheels of a Harappan cart. The stone-paved gate seems to be in use till the Stage VI through Stages IV and V. Evidence of an earlier gate of Stage III was also noticed at the same point. A mud-brick fortification with successive applications of plaster and with an entrance was noticed underneath the wall of Stage IV. The size and lay out plan of Stage III gate could not he ascertained.

In the middle town, in all, seventeen trenches along the northern side of the east-west central road were excavated in order to expose the full width of the road. These trenches lying in the western half of the middle town brought to light successive house complexes of Stages IV and V. In this part of the middle town a major street branching towards north from the main central road and leading towards northern sectors was also exposed. This street measures 4.65 m in width flanked by house-blocks on either side. The excavation revealed that the width of this east-west central road varies from 5.25 m in Stages III and IV to 4.65 m during the Stage V.

A few trenches laid at the southern margin of the open space along the western fortification of the middle town revealed that this portion was occupied by the Stage V people. Though, stray structures of Stage IV were also noticed there, yet it was not regularly occupied during the time. A multi-roomed house of Stage V had room sizes ranging from 3m X 2mto3m X 2.30m with 0.44 m to 0.60 m thick rubble walls.

Plates 16-17



16



17

Dholavira: 16, beads of semiprecious stones and 17, objects of copper

Plates 18-19



18



19

Dholavira: 18, *copper chisels and* 19, *diverse forms of pots*

More than six thousand antiquities were added to the already recovered large collection of Harappan antiquities. The unique antiquities recovered during the season include a ring-seal of steatite, seal with a copper ring running through the boss of the seal and a graduated scale made on a charred rib of a large animal. Besides, other objects such as steatite seals, terracotta sealing, beads of semiprecious stones and shell, Chert blades, drill-bits and other objects made of steatite, terracotta, shell, semiprecious stones and copper were recovered along with varieties of ceramics (pls. 16-19).

22. EXCAVATION AT BAGASRA, DISTRICT RA.IKOT

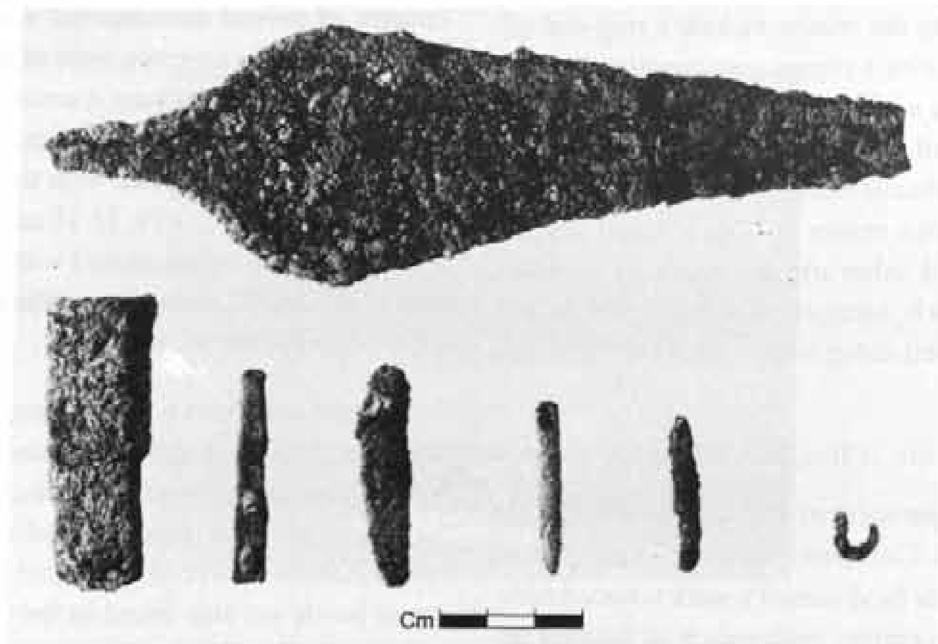
The Department of Archaeology and Ancient History, M.S. University, Baroda, in continuation of the last four field-season's work resumed excavation in the current field-season at Bagasra under the direction of V.H. Sonawane, assisted by K.K. Bhan, K. Krishnan, S. Pratapachandran, Abhijit Majumdar and P.Ajithprasad. Eleven trenches, each measuring 5 X 5 m were opened at the center as well as the western edge of the site with a view to ascertaining the habitational features in the last phase of Urban Harappan occupation and for understanding the configuration of the fortification wall in the western side of the settlement.

Five new trenches were opened in the central part of the mound with a view to exposing the horizontal spread of habitational features, especially structural remains of the terminal phase (phase III) of Urban Harappan occupation. The thickness of phase III deposit in these trenches varied from 80 cm to 2.00 m. It is predominantly ashy and incorporates, structural remains, pottery and other habitational debris. Structures of this period were made of rubble-stones and mud-bricks. They appear weak and flimsy, as the remains of wall are thin and disjointed. Although remains of several disconnected walls could be identified in these trenches, none of them fall into a complete plan of structure. A series of floors and working areas in the form of thin, hard whitish bands are found associated with these structures in the Trenches E15, El9, El 11 and EK 4. They are also found to be associated with open hearths and a few buried storage-jars, which in fact is a significant feature of this phase.

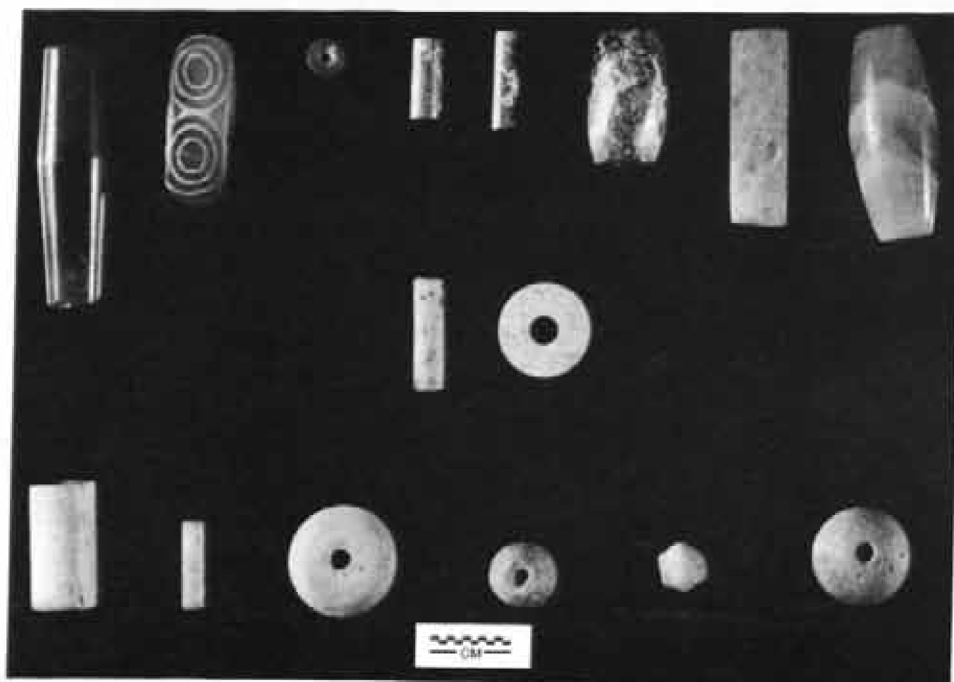
As was reported in the previous seasons, pottery from this phase is predominated by the Sorath Harappan vessels, especially bowls, basins, dishes, pots and large jar; mostly in red ware and buff ware. A few sherds of white painted black-and red-ware bowls are also found in the assemblage in addition to the classic Harappan pottery. The assemblage is comparable with the Rangpur Period-II A and IIB as well as Rojdi-A and B pottery. Considerable number of shell bangles, ladles and inlay pieces, beads of carnelian, agate, lapis lazuli, steatite and faience are also found in this deposit. The shell objects recovered from this phase included a rare specimen of a small pulley-shaped ear-stud. Faience and shell working appeared to be very active in this phase. The flimsy structures and extensive ashy deposit showing no proper management of the waste disposal may indicate the decadent state of economy at the terminal stage of the Harappan culture. The faunal remains show a greater dependence on aquatic fauna during this phase than the earlier.

As the excavation did not go down much deeper in these trenches, substantial deposit belonging to the phase II of the Urban Harappan could be exposed in the central part of the mound,

Plates 20-21



20



21

Bagasra: 20, copper implements and 21, ornamental beads

except in the Trench Ek4. However, the Trenches Eb3, Eb7 and Eb 11 at the western edge of the mound, primarily excavated for tracing the western fortification wall, revealed both phases-II and I deposit. In these trenches the phase-I habitation is found to be resting on a black clayey deposit, which in turn is found lying directly over the hard surface of an indurated reddish yellow gravel. Remains of a mud-brick structure with four vertical courses of brick are found at the earliest level in Trench Eb 11 indicating that the mud-brick size conforms to the Harappan ratio, the colour and composition of the mud/clay used for their production appear different form the phase-II bricks. A veneer of intensely burnt-clay plaster associated with this wall and about 30 cm thick ashy deposit mixed with lumps of burnt clay around it indicate that the structure, in fact, was part of a kiln or hearth.

In addition to the structural remains, the trench revealed about 1.20 m thick deposit of habitation debris of this early phase and a reasonably well-preserved floor, plastered with a thin layer of whitish clay. The pottery of phase-I is predominated by the vessels belonging to a local ceramic tradition and the Anarta pottery of the north Gujarat region. Distinct vessel forms and the use of white or cream pigment for .painting on this pottery indicate their early/pre-Harappan lineage. Subsequent deposits in this trench belonged to the phase-II, which is marked by the construction of a fortification wall. The thickness of this tapering wall at the base is 7.75 m and at the extant top, at a height of 5.50 m, it measures 5.20 m. However, as the top was heavily eroded, the extant height of the wall in the western side is only 2.60 m. Besides, it was also disturbed by robbing of stone slabs from the outer edge. The base of the wall, upto a height of 1.10 m, was built of six to seven courses of stone slabs. Among these, the first three courses, which are found cutting through the phase-I deposit, formed the foundation of the wall in the first stage (Stage-I) of construction. The last two courses of stones were added on top of the earlier base in the second stage (Stage-II) construction. The stone encasing in the outer side might have been much higher and these stones were later robbed off. From the debris associated with the wall was found a circular stone with a large hole at the center. The stone is well chiselled in a stepped/tiered fashion, as if it was originally the basal part of a cylindrical pillar. It, therefore, presupposes the presence of a pillared entrance in the wall, not located so far in the excavation.

The phase-II incorporates about 2.20 m thick habitation deposit associated with the fortification wall. Apart from other things, the phase-II in the beginning itself suggests industrial activities including shell and copper working. Remains of a kiln/foundry reported in the Trench Eb 11 appears to have been used for copper working/smelting. Several copper implements including a large spearhead; a well made chisel, rods and a fishhook were reported form the phase-II (pl. 20). In addition to this, production of shell bangles, pendants, inlay pieces and beads was also popular in this phase. A few ornamental beads of semiprecious stones including an etched carnelian "eye-bead" and a long bi-conical one was also reported from this level (pl. 21). Other important antiquities found in this phase include a number of faience, steatite beads, terracotta toy-cart frames, wheels and a small terracotta dog figurine.

Ceramic assemblage from the phase-II is predominated by the classic Harappan vessels of distinct shape and decoration. Besides, the bichrome pottery of the local tradition and the Anarta pottery of north Gujarat are also found in this phase. The Sorath Harappan pottery, on the other hand, started appearing only in the upper levels of phase-II, which in the current field season is encountered

only in the Trench Ek4 at the central part of the mound. The assemblage also included a few sherds of Reserved Slip Ware and sherds with surface treatment resembling "Wet Ware" with a light cream slip.

HARYANA

23. EXCAVATION AT RAKIIIGARIII, DISTRICT, HISSAR

In continuation of the previous year's *{1997-98,* pp. 55-63; *1998-99,pp.* 13-23) work, the Institute of Archaeology, of the Survey, under the direction of Amarendra Nath, assisted by R.D. Singh, Vasant Kumar Swarnkar, L.S. Mamani, R.S. Rana and Umesh Kumar resumed excavation at Rakhigarhi (29 16' N; 76 10' E). It lies in the alluvial plains of now dried up Drishadvati (Chitang), a tributary of ancient Sarasvati (Ghaggar). The site is consisted of seven mounds measuring over 118 hectares in dimension. Largely overlain by modern villages Rakhikhas and Rakhishahpur, the site gained its legitimate protection when the five virtually interlocked mounds were notified as RGR-1 to RGR-5. Another mound in the north-western vicinity of Rakhishahpur, yielding Early Harappan remains, inadvertently remained unnotified, was numbered as RGR-6. Likewise other mounds reported to the north of RGR-1 and RGR-2, numbered as RGR-7, is a burial site. Besides imparting training to the students of the Institute of Archaeology, the other objectives of the excavation were: (a) locate the cemetery area for ascertaining the funerary practices; (b) trace further the fortification wall of the Citadel mound RGR-2; (c) investigate further the nature and function of platform-like structure of the Citadel mound RGR-2; (d) understand the beginning of the Early Harappan culture besides (e) the nature of Early and Mature Harappan crafts.

Keeping these objectives in mind, the excavation was carried out at RGR-1, RGR-2, RGR-4, RGR-5, RGR-6 and RGR-7. Two distinct cultures were identified in the course of excavation, namely, Early Harappan and Mature Harappan. Early Harappan occupation was witnessed at RGR-6 while RGR-1 and northern part of RGR-2 produced evidence of both Early Harappan and Mature Harappan habitation while RGR-4 and RGR-5 yielded Mature Harappan remains only.

Limited excavation conducted down to 7.2m depth in Trench M12 at RGR-6 shows gradual development of Early Harappan culture. Natural soil could not be reached due to regular occurrence of structures at different levels. Six such structural phases were identified. On the basis of these structural phases the occupation of Early Harappan period may be divided into two sub-periods, namely, Period -1 (a) pre-formative urbanism and Period — I (b) formative urbanism.

Period - I (a) : Pre-formative Urbanism : Three structural phases were exposed in a limited area of excavation at RGR-6. In the Structural phase-1, a thick mud platform like structure, virtually cut but was noticed in the northwestern section of Trench Ml 2/2. It was sealed by layer (15). Further details of this platform could not be ascertained due to limited space. Structural phase-2 revealed a circular structure (dia-2 m) with an entrance (90 cm wide) towards south, made of wedge-shaped sun-dried mud-bricks. Contemporary to the circular structure was noticed, a rectangular structure (2.20m X 1.60m) made of sun-dried mud-bricks (33 X 24 X 9 cm). Both the structures had mud floors. These structures are sealed by layer (10). In Structural phase-3, a series of rectangular house plan was exposed immediately below the street of Period-I (b). The walls were running right

across the cutting of street. Light greyish sun-dried bricks were used to build these structures, which is sealed by layer (7).

Structural remains of sub-Period-I (a) was also witnessed at RGR-1. In the Trench K3 a circular structure (dia 1.90 m) with an entrance (90 cm) was unearthed. The structure is outlined by four courses of mud-bricks with post-holes at intervals suggesting walls of wattle-and-daub. Here, the inner floor of the structure was mud-plastered while the outer area was paved with burnt-brick bats. In the same trench another rectangular structure (2 m X 0.80 m) was also noticed. It is a mud structure with an inverted pot inside besides scattered potsherds. This trench is proposed to be excavated further in order to understand the nature of lay out of these structures, apart from the deposits of preceding cultural horizon.

Period -1 (b) — formative Urbanism : During this period an organized living pattern was emerged. At RGR-6, in Trench Ml2, houses were built on either side of 1.92 m wide east-west running street. In the cutting of street three successive structural phases were noticed which generally overlain above the preceding structural phases. In the Structural phase-4 a rectangular structure (3 m X 2.45 m) built of sun-dried bricks of 3:2:1 ratio was uncovered. Inside this structure, two oblong pits were noticed showing firing activity. These are filled with ash. Structure of this phase is sealed by layer (6). In the successive phase (5) a house, consisted of two rectangular rooms (4.35 m X 1.78 m; 4.35 X 2.62 m) with courtyard, was planned on one of the sides of above mentioned street with north-south running 92 cm wide lane. On the other side of the lane, the same layout of the house was partially exposed due to the limited excavation. These structures were built of sun-dried mud-bricks of 3:2:1 ratio. Inside one of the cells (2.20 m X 2.40 m), a circular pit hearth (dia - 1 m) outlined by sun-dried brickbats was exposed. The same was also exposed inside one of the rooms, noticed on the other side of the street. The similar type of 'hearth' locally known as *'hard'* is still in vogue in nearby village for boiling and preserving milk. Structural phase-6 has a squarish room (3.20 x 3.20 m) with 1 m wide entrance towards south, built within an enclosure wall (52 cm wide), running east-west was exposed upto 10.35 m length. The same layout was also noticed on the other side of the street where another enclosure wall (90 cm) was exposed upto 6.36 m. So, further excavation is required to expose complete plan of a house of this period.

The Early Harappan ceramic industry is represented by all the six Kalibangan fabrics besides grooved ware of Hakra origin and more frequently the chocolate-slipped ware of typical Rakhigarhi variety. Important shapes in grey ware are legged-basin, dish and dish-on-stand along with a considerable number of bowls found in bichrome ware. Other noteworthy shapes in red ware are vase, *lota,* storage-jar, *handi,* dish-on-stand, bowl, trough etc. Paintings were often executed in black over red-slipped surface. Important pottery designs are simple horizontal band generally found around the neck of the pot showing actual height of the neck, triangles in a row, sun, *peepal* leaf, geometric, floral and horn motifs etc. Large number of animal bones found during the excavation throw important light on animal husbandry—probably a common profession among the Early Harappan people.

Noteworthy antiquities are graffiti on potsherds, sling ball, hopscotch, terracotta bangle fragments of grey fabric sometimes having incised decoration and are segmented also, terracotta wheel and frame (toy cart), bone point, terracotta rattles, terracotta animal figurine, bead polisher, quern and muller of stone. The occurrence of copper fish-hook, bangle, arrow-head, shell bead, ste-

atite beads, Chert blade, terracotta seal testify trade networks established during the period along the major rivers and land routes to connect settlements to facilitate the movement of finished products and raw materials.

Period - II - Mature Harappan : Mature Harappan deposits are confined only to RGR-1, RGR-2, RGR-4 and RGR-5 while the cemeteries of Mature Harappan period are located at RGR-7, RGR-1 and RGR-5 which produced evidence of craftsmen area. A brick kiln, many small kilns for firing various Harappan objects, a bead making area and a north-south running street were unearthed at RGR-1. Finds like a large number of bone points and an ivory comb and cut pieces clearly indicate that this area was inhabited by bone/ivory craftsmen. The lapidary workshop was noticed at RGR-1. In this complex were noticed roughly three thousand bead rough outs of different stages of bead making along with finished ones mostly in carnelian, chalcedony, agate and jasper, together with bead polishers for grounding and hearth for heating the stones at different stages of chipping. The base of the storage-jar filled with terracotta cakes was perhaps used as hearth. Another hearth of oval shape was noticed on the western slope of RGR-2, abutting the inner fortification wall, filled with charred river shells for extracting lime. In one of the cuttings of RGR-5, discovery of good number of finished and unfinished bone points and debitage of ivory and fragment of bone comb suggest pursuance of specialized crafts of ivory and bone carvings.

A series of mud-brick platforms having a brick (fired) well in-between were noticed during the excavation. Evidence of thick burnt-brick wall encasing the mud-bricks podium is also interesting. It is conspicuous to note that between the podiums, a burnt-brick well was also traced to suggest its relevance with the podium. One of the podiums had in-built oblong pit chamber, out of which two were systematically excavated in stages. The sediment within this pit contained pieces of fresh cattle bones, charcoal and pottery fragments mostly of dishes and bowls. Apart from this, over the podium fire-altars having four segments were noticed, extended in north-south orientation. All these indicate its use for ritualistic congregations during some festivals.

The excavation of citadel mound (RGR-2) revealed western part of fortification wall of mud-brick with an evidence of entrance on the south-western part. The fortification wall exposed upto 25 m in length and the width of the wall was 12 m with an extent height of 1.5 m consisting of fifteen courses in tapering order. The inner side of the fortification wall bears thick mud-plaster. The central portion of the stepped-entrance (3.5 m in width) to the fortification was made of burnt-bricks, which was damaged due to later pit activity. The entrance, incidentally, corresponds with the contour profile of the citadel mound.

Three types of sanitation namely, public drains, street drains and house drains generally covered and terminating into a soakage-jar were unearthed.

The ceramic industry mainly consisted of red ware although some sherds of grey ware, a few sherds of non-glazed Reserved-Slipped Ware, cut ware and cream-slipped ware were also recovered. Red ware divided into three categories: red-slipped ware; black painted red-slipped ware and black painted ware with shapes such as perforated jars, goblets, dish-on-stand, vase, jar, ledged-rim vessel, fluted-vessel, ribbed-vessel *handi),* dish, basin, trough, etc were recovered. Paintings are usually executed in black-on-red-slipped surface. The important motifs are *pipal* leaf, palm leaf, triangle, loop, intersecting circles, linear designs, etc., besides a few sherds with peacock and fish motifs.

Cattle bones outnumbered other animal bones including that of wild variety, which indicates the existence of highly rich pastoral land in the neighbourhood. Among the floral remains only charred-wheat and barley and *'bathua'* seeds could be identified so far. Evidence of rice husks noticed in the plaster remains to be examined.

Important antiquities are gold fillet, beads, silver, copper and shell bangles, etched and plain beads of siliceous material, steatite and faience beads, chert weights and measure, gamesman and game board. Other noteworthy finds are squarish stamped-steatite seals, steatite and faience tablets, terracotta sealings. Large number of terracotta animal figurines, bangles, toy cart frames, wheels, rattles, chert blades were also recovered along with a number of bone implements, such as bone points, copper implements like arrow-heads, spear-heads, chisels, bangles, mirror, ring and fish-hooks.

The Mature Harappan cemetery area (RGR-7) was located about 200 m north of RGR-1, RGR-2 and RGR-3. One trench of 10 m x 10 m revealed eleven burials. All are primary inhumation type extended burial. The dead was buried in an oblong pit with head kept towards north and slightly tilted towards east with a few exceptions of tilt towards west also. In majority of cases, grave goods generally consisting of pots and pans were found behind the head. Three skeletons wore shell bangles in their left wrists. A miniature gold armlet was also found near a female skeleton. Three phases of burial could be identified. Of these the earliest one is burial No. 11. The upper burial was damaged by later burial activity. The cluster of burials, revealed from a 10 m square, indicate community of family burial.

HIMACHAL PRADESH

24. Exploration in Banjar (Inner Saraj), District Kullu

Under the scheme of problem oriented survey, the Chandigarh Circle, of the Survey, under the direction of C. Dorje, assisted by M.S. Chauhan and Sanjay Kumar Manjul and Arvin Manjul carried out extensive exploration in the remote localities in Banjar (Inner Saraj) of the District Kullu and brought to light the following antiquarian remains.

Site/Village	*Nature of remains*
Badagaon	A wooden pent-roofed temple consisting of *garbhagriha* and *mandapa,* a *ratha* adorned with thirteen metal *moharas* (seventeenth century); stone sculptures and architectural members (eighteenth century)
Baggi	A four-storeyed temple of Shringa Rishi hosts a *ratha* adorned with eleven metal *moharas* (eighteenth century); sculptures of Siva and Parvati (seventeenth century)
Bahu	A wooden pent roofed temple of Siva consisting *of garbhagriha* and an open pillared *mandapa* (eighteenth century)
Balagad	A three-storeyed pagoda temple of Markandeya Rishi consisting of *garbhagriha* and an open pillared *mandapa* (nineteenth century); loose sculptures and architectural members (eighteenth century)

Plates 22-23



22



23

22, *Chahni Kothi and* 23, *Murlidhar Temple: Takri inscriptions*

Plates 24-25



24



25

Ghiyagi: 24-25, Shringa Rishi Temple, brass moharas

Plates 26-28



26



27



28

Gushaini: 26, Durga Temple and 27-28, carved door-jambs

Site/Village	*Nature of remains*
Bandal	A pagoda temple of Durga enshrining a *ratha* adorned with eight metal *moharas,* bearing an inscription in Takri (eighteenth- nineteenth century)
Chahni	A nine-storeyed rectangular tower (pl.22) made of dressed sandstone and wooden beams, seven metal *moharas* (eighteenth century); a five-storeyed pent-roofed tower (eighteenth century); a seven-storeyed pent-roofed temple enshrining a black stone sculpture of *muralidhara* with an inscription (pl. 23) in Takri (seventeenth century)
Chanon	A pent-roofed temple (nineteenth century); loose sculptures and archi tectural members (seventeenth-eighteenth century)
Chipni	A double-storeyed pent-roofed temple of Laxmi-Narayana (nineteenth century)
Chkurtha	A wooden pent-roofed temple of Kumhrunag consisting *of garbhagriha* and an open pillared *mandapa* (eighteenth century)
Dhameuli	A wooden temple of Ishar Mahadeva consisting of *garbhagriha* and *mandapa,* a *ratha* adorned with eight metal *moharas* with an inscription in Takri, stone sculpture of Siva and Parvati (seventeenth century)
Ghalyada	A wooden pent-roofed temple of Laxmi-Narayana enshrining stone images of Vishnu and Laxmi (seventeenth century)
Ghameda	A square pent-roofed temple of Seshanaga (nineteenth century)
Ghiyagi	A *ratha* of Shringa Rishi adorned with eight metal *moharas* (eighteen-nineteenth century); seven metal *moharas* (eighteenth century) (pl. 24-25)
Gushaini	A wooden pent-roofed temple (pls. 26-28) consisting *of garbhagriha* and an open pillared *mandapa* enshrining a sandstone sculpture of Mahishasuramardini (sixteenth century)
Gushala	A pagoda temple of Buglu Mahadeva hosts a *ratha* adorned with eight metal *moharas* (nineteenth century); a wooden pent-roofed temple of Hidimba Devi consisting of *garbhagriha* and an open *mandapa* hosts a metal *mohara* (fourteenth century); a pent-roofed wooden temple of Siva (eighteenth century)

Plates 29-31



29



30



31

29, Koki: miniature temple; 30, Mangalor: remains of temple and 31, Chhota Dara: stone circles

Site/Village	***Nature of remains***
Kalwari	A three-storeyed pent-roofed temple hosts a *ratha* adorned with eight metal *moharas* (seventeenth century)
Kandheri	A wooden pent-roofed temple of Adi-Brahma (nineteenth century); a stone sculpture of Surya (twelfth century)
Kanon	A double-storeyed pagoda temple of Sundeo Rishi hosts five metal *moharas* (thirteenth century)
Koti	A small *sikhara* temple of Siva consists of *garbhagriha* and an open *mandapa* (seventh-eighth century); a three-storeyed square stone temple (pl.29) (seventh-eighth century)
Kotla	A double-storeyed, pent-roofed temple of Chhumahunag hosts a *ratha* and metal *moharas* (seventeenth-eighteenth century)
Mamjhan	A *ratha* of Markandeya Rishi adorned with eight metal *moharas,* four metal *moharas* (seventeenth century)
Mangalour	A wooden pent-roofed temple of Markandeya Rishi (nineteenth century); a wooden pent-roofed temple of Hidimba Devi enshrining a stone sculpture of Mahishasuramardini (thirteen-fourteenth century); a stone temple (pl.30) located on a hillock known as "Mangal Sen-ka-tila" (twelfth-thirteenth century)
Mujhali	A double-storeyed pent-roofed temple (nineteenth century)
Nauli	A square stone temple of Seshanaga (eighteenth century and *mohara*
Pujali	*A* wooden pent-roofed temple of Mahishasuramardini consists of rectangular *garbhagriha* and an open.pillared *mandapa* hosts a stone sculpture of Mahishasuramardini (sixteenth-seventeenth century)
Shili	A pent-roofed temple Cholunag enshrining a *ratha* adorned witheight metal *moharas* (eighteenth century); a stone sculpture of Mahishasuramardini (seventeenth century); a brass sculpture of Ganesa (seventeenth century)
Shupnil	A wooden pent-roofed temple hosts a *ratha* adorned with eight metal *moharas* (eighteenth century)

Site/Village	*Nature of remains*
Sindhwa	A stone pent-roofed temple of Ghatotkacha hosts seven metal *moharas* (sixteenth-seventeenth century)
Seoli	A pent-roofed temple hosts a *ratha* adorned with eight metal *moharas* (eighteenth century)
Tandi	Three-storeyed pagoda temple of Seshanaga hosts eight metal *moharas* (eighteenth century)
Targali	A wooden pent-roofed temple of Hidimba Devi consisting of *garbhagriha* and an open pillared *mandapa* enshrining a sculpture of Mahishasuramardini (thirteenth-fourteenth century)
Thamicher	A wooden pent-roofed temple of Laxmi-Narayana hosts a metal *mohara* (ninteenth century); two wooden masks (eighteenth century)
Thatibid	A wooden pent-roofed temple of Bashkeynag consists of *garbhagriha* and an open pillared *mandapa* (eighteenth century)
Tinder	A rectangular pent-roofed temple of Laxmi-Narayana (eighteenth century)

25. EXPLORATION IN SPITI VALLEY, DISTRICT LAH AIL AND SPITI

Under the scheme of problem oriented survey, the Chandigarh Circle, of the Survey, under the direction of C. Dorje, assisted by Piyush Bhatt, Rahul Bhosle, Jasmer Singh and Rajesh Bakshi explored Spiti Valley and discovered the following sites of archaeological interest, assignable to the tenth-eleventh century to the seventeenth-eighteenth century.

Village	*Nature of remains*
Bathal	Mane-walls with inscribed pebbles and slabs
Bharya	Chortens and Lhato
Chaitru	Mane-wall having inscribed *dharani* slabs
Chhota Dara	Stone Circles (pl.31)and inscription engraved on rock, Dhankhar Buddhist monasteries, Mane-Dungyur, bronzes, Mane-walls, Chortens
Gud	Gumpa and Chorten

Plates 32-33



32



33

Gungri: Buddhist monastery, 32, wall paintings and 33, stucco figure

Plates 34-35



34



35

Hansa: 34, mane wall and 35, chorten

Village	*Nature of remains*
Gungri	Buddhist monasteries containing wall paintings (pl.32), stucco figures (pl. 33),Mane-walls and Chortens
Hansa	Newly constructed Gonpa over remains of ancient Gonpa, stucco, Thankas and objects
Hansa	Mane-walls, chortens (pls.34-35), Gonpa
Hikid	Chortens
Hikim	Ruined structures, mane-wall and Chorten
Hull	Buddhist Lhakhang with three stucco images, prayer wheel, paintings and religious objects
Kaha Dogri	Lhato and Chorten
Kanzom Pass	Mane-walls, inscribed stones, stone image of Paldan Lhamo
Kaza	Few Chortens (pl.36) and mane-walls
Khar	Chorten and Gonpa
Kholaksar	Lhato
Kiamo	Mane-walls and Lhato
Kibber	Two Gonpas containing stucco figures, wall painting and other religious objects
Kioto	Mane-stones, mane-walls, Lhato at several places
Komic	Gonpas, Chortens and mane-walls
Kuang	Chortens
Kurik	Monastery containing wall paintings and stucco figures and mane-wall
Kurith	Chortens and inscribed stone slabs and pebbles mane
Kye	Buddhist monasteries, Chortens and mane-walls
Langza	Gonpa and Chorten

Plates 36-37



36



37

Kaja: 36, Chortens and 37, Lhalun : stucco images

Plates 38-39



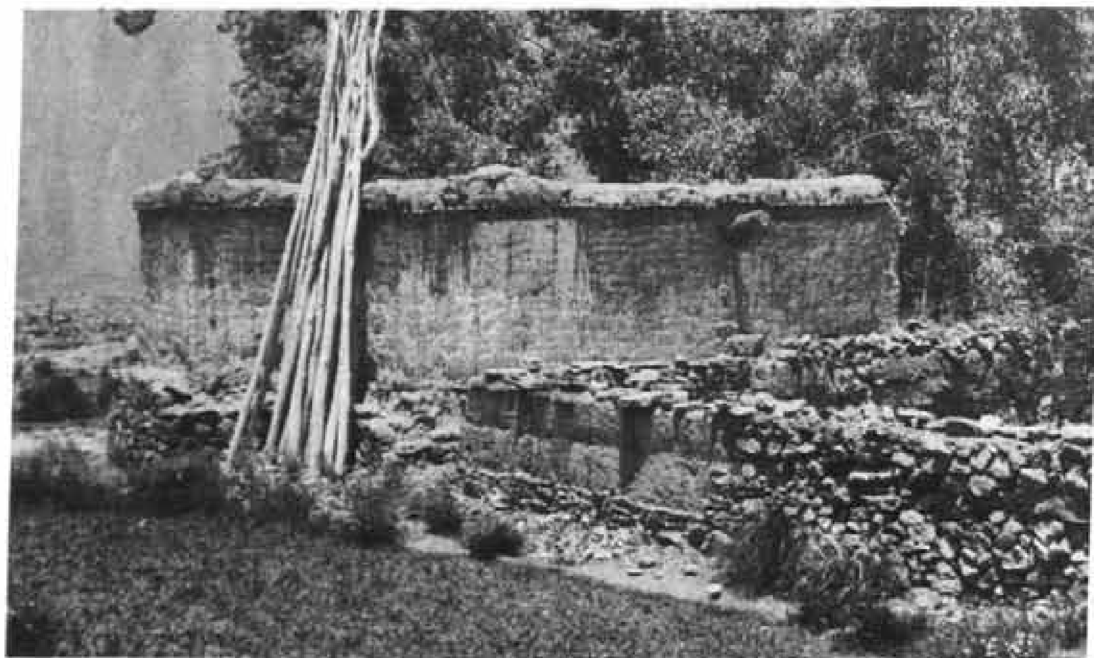
38



39

Lhalun: 38, stucco images and 39, Lidang : chortens and mane wall

Plates 40-41



40



41

Nadang: 40, Buddhist monastery and 41, stupa

Village	*Nature of remains*
Lara	Buddhist monastery and Chorten
Lari	Buddhist monasteries, Chortens and mane-walls, cave with stucco image of Padmasambhava
Lhalun	Buddhist monastery with Buddhist images (pls.37-38) datable to eleventh century AD, Chotens and inscribed slabs
Lidang	Chortens and long mane-walls (pl.39) Mane-walls
Lingti	with inscribed stone pebbles and slabs Gonpa,
Losar	mane-walls and Lhato
Mane Gongma	Structural remains of two Gumphas, three miniature Chortens, stucco figures
Mane Yogma	Buddhist monastery, Chorten Three
Morang	mane-walls, Gonpa, Lhato
Nadang	Buddhist monastery (pl.40) assignable to eleventh-twelfth century, Chortens and mane-walls (pl.41)
Pangmo	Gonpa, Chortens, mane-walls and Lhato
Pangmo-Kito	Three mane-walls
Phokchung	Chortens and Lhato
Poh	Buddhist monastery, Thungyur, mane-walls and Chortens
Pomarang	Menhirs like stone with hand as well as wheel made red ware
Rama	Chorten, mane-Walls
Rangrik	Gonpa and number of Chortens
Sagnam	Chorten
Shego	Mane-walls
Shichiling	Three miniature Chortens

Plates 42-43



42



43

Sumling: 42, stupa and 43, chortens and mane wall

Village	*Nature of remains*
Shilling	Buddhist monastery
Sumling	Buddhist Lhakhang, four mane-walls with inscribed slabs, Chortens and mane walls (pi. 42-43)
Tabo	Number of rock-engravings on boulders depitcting animal, human, faunal, stupa etc; stone circles
Takche	Mane-walls
Tangti Gogma	Chorten
Tangti	Yogna Chorten

26. EXPLORATION IN KARSOG TEIHSIL, DISTRICT MANDI

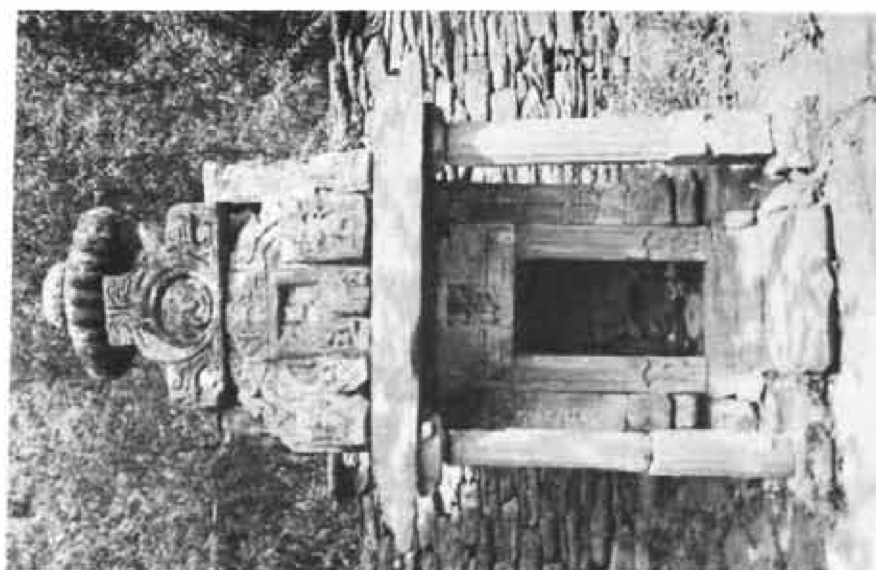
The Chandigarh Circle, of the Survey, under the direction of C. Dorje, assisted by Piyush Bhatt and Rahul Bhosle carried out exploration in Karsog to ascertain the archaeological potentiality of the area and brought to light the following archaeological sites.

Site/Village	*Nature of remains*
Bajendi	A rectangular pent-roofed temple of Kali Nag consists of *garbhagriha* and a pillared *mandapa* (eighteenth-nineteenth century)
Banera	Nag-Devta Temple with loose sculptures and architectural members (sixteenth-seventeen century)
Banthal	Pottery of early historical and late medieval period
Chandla	A ruined temple-complex comprising two Siva temples (twelfth-thirteenth century)
Chindi	A renovated temple of Durga consisting of two *garbhagrihas,* a *mandapa* and a porch hosts a stone image of Vishnu and Ganesa (seventeenth-eighteenth century)
Churag	Sonali Nag Temple consists of a *garbhagriha* and a *mandapa* hosts a stone image of Vishnu and metal *mohara* (sixteenth-seventeenth century); loose sculptures and architectural members (sixteenth-seventeenth century); pottery site of the late medieval period; renovated temples (eighteenth-nineteenth century)

Plates 44-45



45



44

Janeyad: 44, *Siva Temple and* 45, *Gauri-Shankara in the sanctum*

Village	*Nature of remains*
Fras	A rectangular pent-roofed temple hosts a stone image of Gauri Sankara (seventeenth-eighteenth century); loose sculptures and architectural members (sixteenth-seventeenth century)
Janeyad	A miniature Siva temple (pls.44-45) in Nagara style consists of a *garbhagriha* and a porch hosts a stone image of Gauri-Sankara (ninth-tenth century); loose sculptures (ninth-tenth century); ancient *baolis* (seventeenth-eighteenth century)
Kao	Kamakhya Devi Temple with metal *moharas* and stone sculptures (tenth-eleventh century); pottery site of the early historical and late medieval period
Karsog	Pottery site of early historical and late medieval period
Kattal	Ancient *baolis* (eighteenth-ninteenth century)
Koti	A double-storeyed temple of Koti Nag consists *of & garbhagriha* and several rooms (eighteenth-nineteenth century)
Kumarla	Stone burials, pottery, early historical and late medieval period
Lyad	A Siva temple (seventeenth-eighteenth century)
Mahu	A renovated temple-complex of Mahu Nag consists of four *garbhagrihas* and several chambers (seventeenth-eighteenth century)
Mamel	Mamlesvara Temple with metal *moharas* and loose stone sculptures (ninth-tenth century); Anna-puma Devi Temple with loose and mounted sculptures (sixteenth-seventeenth century); Imla-Bimla Devi Temple (sixteenth seventeenth century); and pottery of early historical and late medieval period
Nehra	Ancient *baolis,* pottery of early historical and late medieval period
Pangna	A five-storeyed temple of Mahamaya built of stone and wood alternately and hosts stone images of Gauri-Sankara and Ganesa, bronze masks of Durga and an inscribed silver *mohara* of Durga (sixteenth-seventeenth century); looses sculptures and architectural members (sixteenth century); ancient *baolis* (eighteenth-nineteenth century)

Village	***Nature of remains***
Salana	Ancient *baolis* (seventeenth-eighteenth century)
Sarain	A miniature *sikhara* temple (sixteenth-seventeenth century)
Shil	A small rectangular temple of Heera-Mehta (eighteenth-nineteenth century)
Sunarli	Mound with pottery and loose architectural members (fourteenth-fifteenth century)

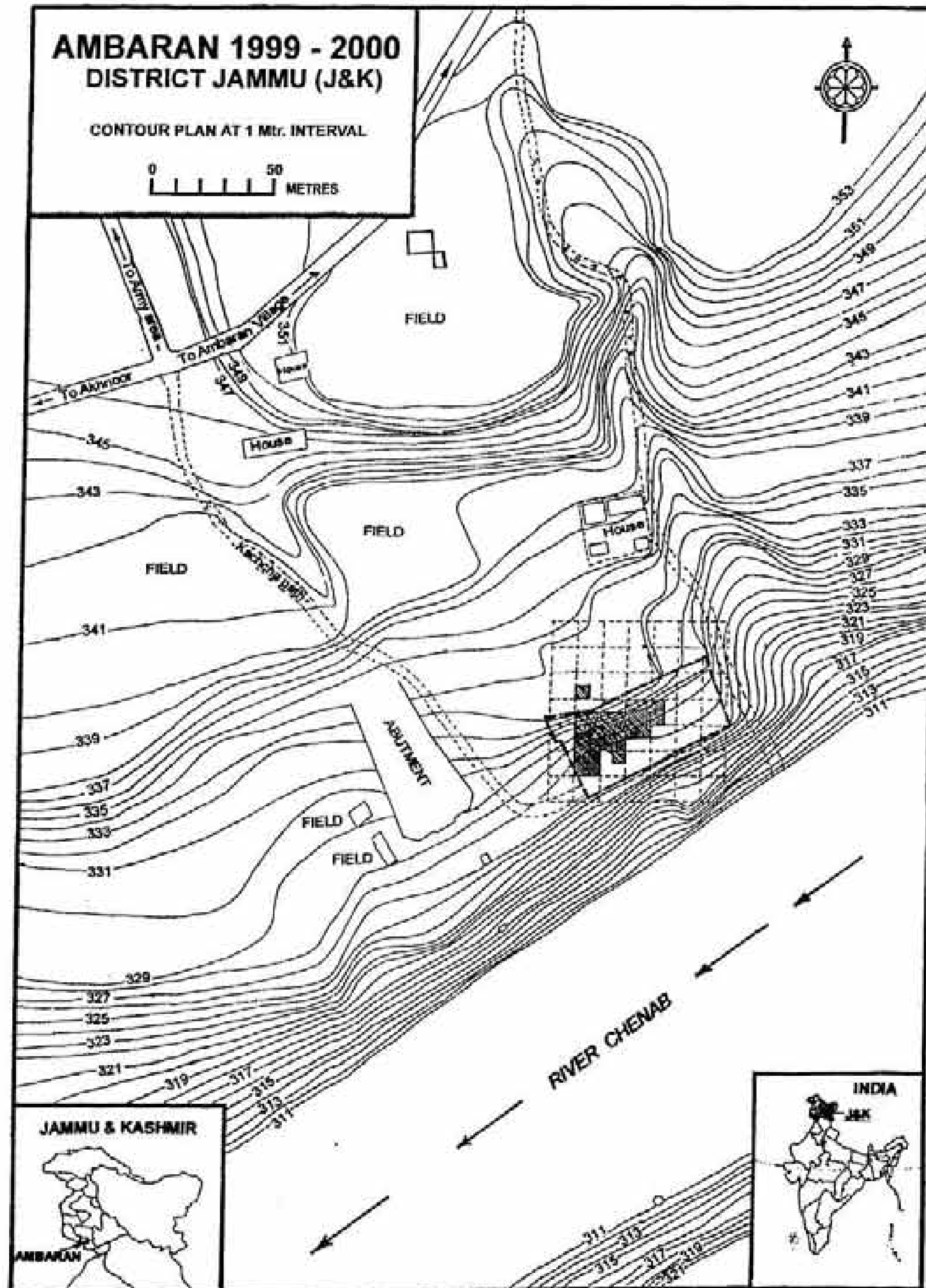
JAMMU AND KASHMIR

27. EXCAVATION AT AMBARAN, DISTRICT JAMMU

Srinagar Circle, of the Survey, under the direction of B.R. Mani, assisted by P.C. Chaudhari, A.K. Khanna, Sujeet Nayan, M.K. Joshi, P.L. Meena, Balbir Singh, Gulzar Singh, R.K. Kaul, Raghubir Singh, Arunji Siddha, V.K. Koul, A.K. Kaul, S.K. Bhatt, S.N. Singh, G.B. Singh and Ashvini Kumar carried out excavations at the hamlet Pambarwan at Ambaran near Akhnur on the right bank of River Chenab, about 28 km north-west of Jammu. The site is famous for earlier yields of the so called Akhnur Buddhist terracotta heads which are preserved in a number of museums throughout the world.

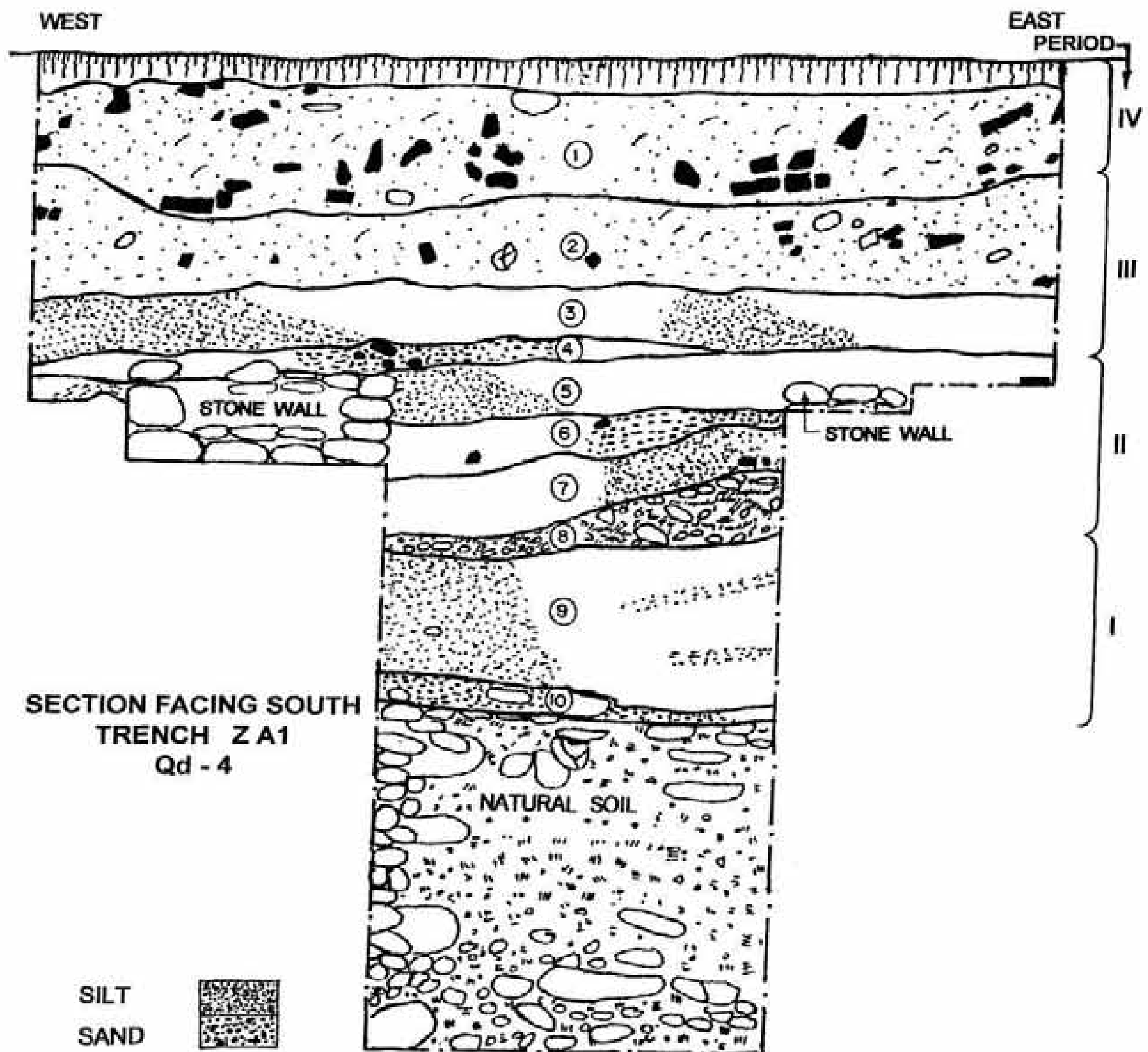
A close resemblance of Akhnur terracotta heads with Gandhara art and the Gupta art of Madhyadesa and confusion regarding their dating forced further investigations as the problem had remained unsolved even after small-scale excavation at the site in 1973-74 *(1973-74,* p. 14).

Excavation was undertaken in 24 quadrants of 9 squares of 10 X 10 m each. The thickness of the cultural deposits vary as per the original contours of the site and in Sq ZAI, Qd 4, it was found to be 2.90 m thick over the natural soil. (fig. 5, pls. 46-47). Burnt brick structures of various phases were encountered in almost all the trenches, which were found damaged mainly due to two reasons-repeated floods in Chenab and unauthorized digging operations in the area in the past (pl. 48). The longer axis of boulders, brought during flash floods and resting at various levels at the site, point towards the course of the river which suggests receding of flood water after deposition of boulders at the site. The cycles of sand, silt and clay were noticed at several levels in most of the trenches. The fact that the site was continuously prone to heavy floods is quite clear in the markings of High Flood Level, close to the site on masonry column of the incomplete bridge of the river. The mark is mentioned as 2.40 m above R.L. 328.0 which means that the recorded HFL in recent past has been 330.40 m above mean sea level. It shows that most of the fenced area of the site was submerged in river flood which would have been a regular feature in ancient excavation. The site seems to have been abandoned sometimes around the seventh century AD due to the above reason.


AMBARAN 1999 - 2000
DISTRICT JAMMU (J&K)
CONTOUR PLAN AT 1 Mtr. INTERVAL
0
50
METRES
FIELD
FIELD
FIELD
FIELD
FIELD
House
House
To Akhnoor
To Ambaran Village
To Army area
Kachcha path
ABUTMENT
RIVER CHENAB
JAMMU & KASHMIR
AMBARAN
INDIA
J&K

AMBARAN 1999 - 2000

0 1 METRE



Plates 46-47



46



47

Ambaran: 46, excavated trenches and 47, deposits

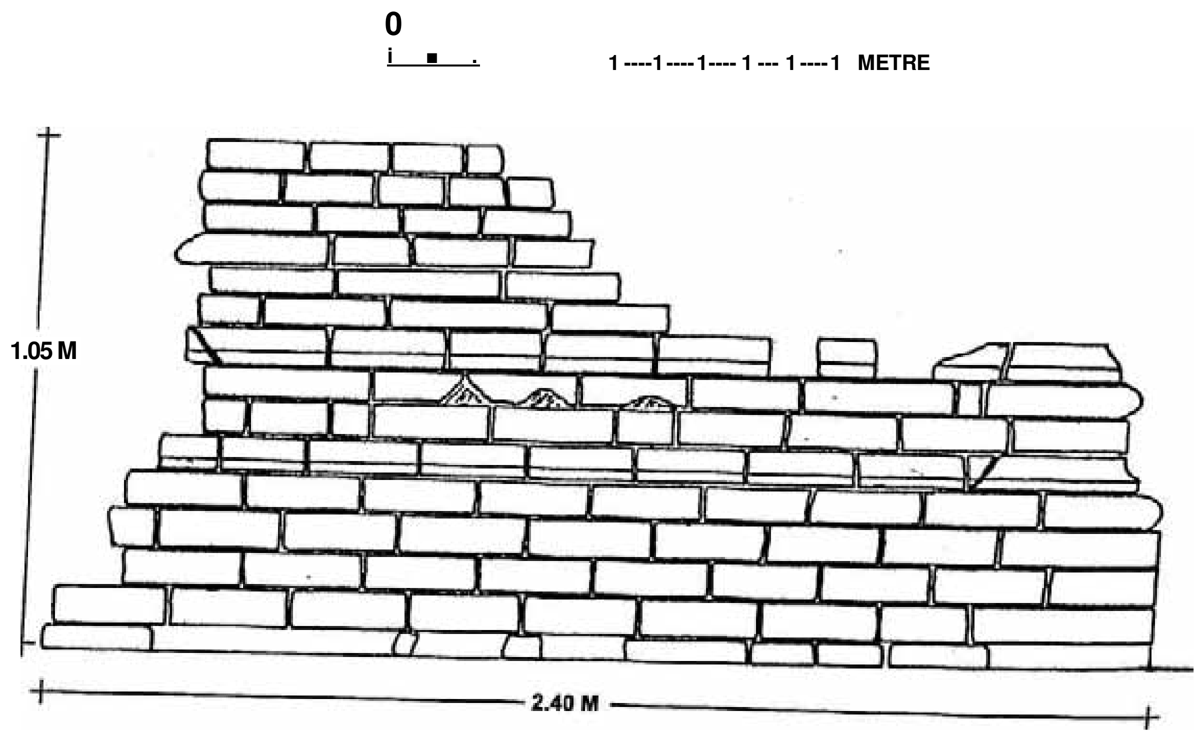
Fig.7

AMBARAN 1999-2000

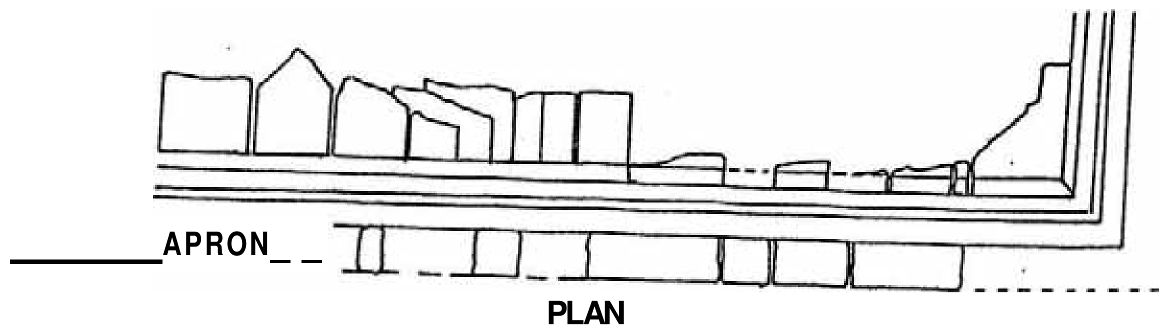
VOTIVE STUPA (PERIOD - II)

0

1 ----1 ----1---- 1 --- 1 ----1 METRE



ELEVATION (FACING NORTH)



PLAN

Plates 48-49



48



49

Ambaran: 48, *brick structures and* 49, *stupa base, Kushan period*

A preliminary study of the site revealed the culture sequence of following period.

Period I: Pre-Kushan period (*c.* second-first BC)
Period *II*: Kushan period (*c.* first to third century)
Period III: Post-Kushan (Gupta) period (c. fourth-fifth century)
Period IV : Post-Gupta period (*c.* sixth-seventh century)

So far no structural remains of Period I were found. A separate horizon of the period was noticed in Sq ZA1, Qd 4 over the natural soil (fig.6). The deposit was thin and contained grey ware sherd of bowls. A sherd of black-slipped ware was also found besides a few such sherds from the surface.

Buddhist monastic establishment (fig.7) seems to have been founded at the site in the Period II. Besides a random rubble wall in Sq ZAI, Qd. 4, all other structures of Period II are in burnt-brick masonry with bricks usually measuring 36 to 38 x 24 x 6 to 7 cm. Two structures with squarish plan were noticed in Qds 3 and 4, Sq B2, with typical Kushan bricks. The larger among the two, in Qd 3 has survived upto fourteen courses (pl.49) with courses of concave-and convex-sided moulded-bricks besides plain ones at regular intervals. Remains of a brick-paved pathway was also noticed in front of these structures. They are most probably bases of votive stupas. Due to heavy floods in the river they were damaged as evident from the deposit of sand and silt around them along with boulders on the eastern side brought during heavy floods.

Sq C1, which comprises the trench of excavation started in 1973-74 and abandoned soon after, brought to light a large platform with tepering walls belonging to Period II with bricks fallen vertically on edges on the top of it. Further excavations at the site may make it possible to understand the nature of the structure which appears to be squarish base of a stupa.

Two distinct structural phases of Period HI were noticed, the first having structures with bricks measuring 27 X 22 X 7 cm in general and the second phase with bricks and brickbats of earlier structures reused, mostly in strengthening the walls which most likely suffered damages due to flash floods in the river (pl.50). Remains of an entrance of some important complex was found in Sq A2 where there was a concentration of terracotta figurines and their fragments which were all used for decorating the wall, probably the facade of the gate of the monastery. A stone pitched pathway leading towards north and flanked by brick walls was noticed. It seems that the entrance was blocked or narrowed during the next phase by putting a wall at the southern end of the pathway, parallel to it at the gate. A large number of terracotta human fingers (pl.51), hands, legs (pi.52), ears, torso parts including those of lady figures with breasts covered with chiton-like cloth and nipples shown with four dots (pl.53), parts of bodies and drapery of Buddha or female devotees, decorative ornaments having floral and other designs, a fly whisk, a headless female deity and one full and some fragmentary relief heads of devotees with open eyelids and elaborate hairdress and ornaments were found. Some of the fingers belong to the life size images while the rest are probably of smaller ones. Shapes of the fingers suggest different postures intended for expressions. These terracottas were perhaps used to embellish the wall of the first phase of Period III.

Heads are in relief showing profile of the face. These along with other fragments of torso,

Plates 50-51



50



51

Ambaran: 50-51, brick structures and fragmentary fingers

Plates 52-54



52



53



54

Ambaran: 52-53, terracotta body parts and 54, pot lugs

ornaments and drapery bear marks of reinforcement as they were meant to stick to the plaster of the wall. Extensions of walls of the structure of Period HI were traced in Squares Bl and B2. It was noticed that structures of the first phase were given extra support and also repaired at different stages during the second phase and even afterwards as these were damaged due to floods. The wall abutting the gate was traced in eastern direction in Qd 3 of Sq A2 and Qds 3 and 4 of Sq B2 and it was observed that its tapering nature and projections were meant to save the structure from floods. A maximum of thirty-one courses of bricks were found in it in Qd 4 of Sq B2 of which the lower twenty-one courses belong to phase I and the top ten courses to a later phase when the structure was repaired. The lower courses slightly project after three courses each giving the tapering nature to the wall and consist of full bricks while the top ten courses do not follow the same principle and were the outcome of the repairs carried out in the second phase or during the Period IV when brick and brickbats were utilized to maintain the height of the structure in haphazard manner. A few decorated bricks were also found reused for the repairs in top courses.

A rectangular structure with its walls having a width of 70 cm was exposed towards west of the large structure of Period II. From the floor of the rectangular structure, chunks of lime-plaster were found lying upside down, possibly the remains of fallen stucco ceiling which was painted with red strips. Its northern wall was found damaged due to unauthorized digging probably by antique hunters in the past. Overlying the levels of Period III. burning activity was also noticed in the sealing layers at some spots which is quite distinct in the northern section of Sq C1, but it would be too premature to relate it to the invasion and destruction by the Hunas as no other evidence is available in this regard. Some reed impressions were also found on clay lumps.

The large complex, which is seemingly a monastery, partly survived during the Period IV when additions and alterations were made in its original structure and repairs were also carried out. Due to cultivation and unmindful diggings at the site, structures of this period which were nearer to the surface, suffered heavy damages and walls with only one or two courses of brickbats could be found. A square structure which is probably a base of brick pillar was seen in Qd 4, Sq Al besides supporting walls and partitions in structures made during this period. The maximum deposit of the period was observed in Qd 1 of Sq A2 consisting of four layers with a distinct layer of brick-debris of some structure. A Huna coin was found near the pillar base in this level.

The thin deposit of layer 10 contains pottery of Period I followed by a flood deposit, as it is evident in Qd 4 of Sq ZAI. Layer 5 to 8 belong to Period II followed by a flood deposit in layer 4 sealing the stone wall. Layers 2 and 3 belong to ' Period III and 1 to Period IV. In most of the trenches the same stratigraphy was observed depending upon situation leading to quantity of deposition of flood and structural debris. The Kushan structures of Period II in Sq B2 and C1 were found sealed by layer 3 and sometimes by layer 2 depending upon their existence in the next period.

As already mentioned a few pieces of grey ware bowls were found from the level belonging to Period I. Rest of the ceramic industry of the site is in red ware, both with or without slip. Pottery of Period II to IV does not have much difference

Plates 55-58



55



56



57



58

Ambaran: 55-56, in-situ terracotta head and a close-up view; 57, terracotta mould with impression of a lady and 58, moulds showing leaf in terracotta

in shapes, except that in the last period, edges of bowls became sharp which were thick and incurved during the earlier two periods. Important shapes are basins, bowls, sprinklers, vases, lids, lamps, handled cup, spouts including one with a grotesque animal head and storage-jars. Stamped-designs have also been found on a few sherds. Amongst the pot lugs an interesting piece bears head of a lion (pl. 54).

Amongst the important antiquities, a large number of decorative terracotta figurines mentioned earlier including the left profile of a princely looking male head (pls.55-56), a broken terracotta mould showing the bust of a lady wearing a beaded hair ornament with a boss at the centre (pl. 57), ear pendants, necklace and armlets, two small terracotta grotesque heads, terracotta moulds of leaves and ornaments, terracotta skin rubber, beads and gamesmen. iron nails, hooks and rings, a few copper objects, a glass and a stone bead, part of a small stone sculpture in Gupta style showing a male attendant holding some object in his raised right hand and the left resting on his thigh. An interesting broken terracotta tablet mould bears on its different faces negative impressions of a pendant, fruits and leaves (pl. 58), a bird sitting on a twig having fruit and leaf and a squatting figure of a monkey. Eight circular copper coins were found. Of these one is blurred, six belong to the Kushan rulers Soter Megas, Kanishka and Huvishka and one to perhaps Toramana, the Huna ruler.

KARNATAKA

28. Excavation at Hampi, District Bellary

In continuation of the last year's *(1998-99,* pp. 59-62) work, under the direction of D. Jithendra Das, assisted by B.K. Unnithan, Uday Anand Shastry and M.V. Mallikarjuna, of the Bangalore Circle, of the Survey, resumed excavation with a view to exposing the structures to the south-west of the octagonal bath, in an area of 4500 sq m.

A large structure (17 X 14 m) enclosed in a courtyard (32 X 22.15 m) aligned in east-west orientation was uncovered. The structure has three landings with flight of steps in the center of each landing and in the third landing a centrally placed square chamber of 3.75 m is located with a narrow entrance at the east. This chamber has a corridor of 8.6 m X 3.25 m. The indented cardinal walls of third landing have rectangular chambers. The second landing has its northern and southern arms extended towards east on to the second landing measuring 8.5 X 4.75m. Interestingly, even though the external walls are built in coursed rubble in mud mortar, internally well-sculptured *kumuda* mouldings encase the inner walls as veneering. Traces of lime-mortar in many layers on the floor of each landing and the *adhishthuana* mouldings speak of its regular usage and maintenance. All along the inner enclosure wall a platform with conventional moudling nearly 2.50 m (wide) and 1.20 m (height) had been built all around the structure immediately following an open courtyard. This platform was accessible through a flight of steps measuring 1.20 X 1.20 X I mat the north-eastern and southeastern corners. The most important aspect being the finding of a number of stucco figures between the inner walls of this platform and the outer enclosure in a passage of 2.05 m wide in northeastern corner of the above described structure.

From the location of these stucco figures it could be easily surmised that these mutilated stucco figures stood under independent *kirttimukha* niches facing south, i.e.. towards octagonal bath.

The structure is datable to the fifteenth sixteenth century.

The pottery is characterized by grey and red ware with utilitarian shapes like spheroidal pots, jars, high-necked pots, lids, platters, featureless rimmed-bowls, shallow shoulder carinated unusually from narrow-to-wide-mouthed pots.

Among the antiquities retrieved, mention may be made of stucco figures in the form of *kirttimukha* of the *torana,* male and female royal figures, creeper, scroll designs and mutilated pigeons besides a few metal antiquities in the form of iron assorted nails of circular and square section, clamps and hooks.

The large terraced-structures exposed during the earlier season along with the present ones were preserved.

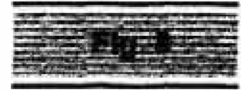
29. EXCAVATION AT ISAMPUR, DISTRICT GULBARGA

In continuation of the previous field investigations *(1998-99,* pp.63-65), K. Paddayya of Deccan College Post-graduate and Research Institute, Pune, undertook further fieldwork comprising both explorations and excavations at the Lower Palaeolithic site of Isampur (16°30' N; 76°29' E). This year's work was aimed at understanding in a more comprehensive way the geoarchaeological context of the site and its various cultural features.

The explorations including geological cuttings in and around the Stone Age locality, which lies in a narrow valley, of the Hunsgi basin enclosed by shale and limestone uplands, confirmed that the site of Isampur lay on the outer edge of a shallow palaeodriange tract (3 to 4 m deep). This palaeodrainage tract is of erosional origin and formed part of the valley floor. The availability of a perennial body of water in this pond-like topographical feature was an attraction to the Stone Age hunter gatherers. It was filled up with brown/ black silts (2 to 3 cm thick) in post-AcheuIian times. Another feature that attracted the Stone Age groups to this locality was the occurrence of a large number of limestone slabs of suitable shapes and sizes (30 to 40 cm across and 10 to 15 cm thick) These slabs formed part of the weathered limestone bed and served as an excellent raw material for tool-making. Isampur is one of the few known Lower Palaeolithic sites in the Old World where limestone was used as the main raw material for flaking.

This season's work produced various lines of evidence such as the occurrence of a large number of hammer stones of quartzite, basalt and chert, presence of limestone cores in various stages of flaking, occurrence of bifaces and other artefacts showing different stages of manufacture and the presence of various classes and sizes of debitage which prove beyond doubt that the site was a true workshop. The occurrence of small quantities of fossil fauna including turtle shell pieces along with cultural material in the excavation shows that the site was also used for the purpose of occupation.

Another important aspect of the Isampur site highlighted by the present excavation concerns its primary or *in situ* character. In fact this is one of the few exceptionally well-preserved Lower Palaeolithic sites anywhere in the Old World. This is proved both by its topographical context (location in a valley, setting and away from any river) and by the fresh physical condition of artefacts of all sizes. The site is well preserved because it was buried under 1 to 1.5 cm thick silt cover, which was quarried away by the Irrigation Department of Karnataka State in 1983.



ISAMPUR EXCAVATION 1999-2000
TRENCH-1
ACHEULIAN LEVEL

0 1 2 METRES

LEGEND

▲	ARTIFACTS	QF	QUARTZITE FLAKE	CC	CHERT CORE		LIME STONE (WEATHERED BED ROCK)
O	CHERT NODULE	CHS	CHERT HAMMER STONE	CT	CHOPPING TOOL		
K	KANKAR NODULE	QHS	QUARTZITE HAMMER STONE	KF	KNIFE		
F	LIME STONE FLAKE	BHS	BASALT HAMMER STONE	BF	BIFACIAL TOOLS (HAND AXE/CLEAVER)		
CF	CHERT FLAKE	C	LIME STONE CORE	D	DEBITAGE		

Excavation proper in this season consisted of extensions to and further digging of Trenches 1 and 5 exposed in the previous season *(1998-99,* pp. 73-77). Trench 1 measured 10 m x 6 m and was excavated upto 45 cm, below surface in the 1998-99 season. In this season it was extended by another 10 sq m, thereby making up a total area of 70 sq m. The bottom portion of the Acheulian level was exposed during this season (fig. 8). This level lay 45 to 50 cm below surface and rested on weathered limestone surface. It consisted of artefacts and limestone blocks, all set in a matrix of hard, calcareous brown silt. The final stratigraphy exposed in the trench is as follows (from top downwards):

Depth below surface	***Cultural/stratigraphic level***
0 -15 cm	Blackish silt
15-20/25 cm	Brownish silt with Middle Palaeolithic artefacts of chert
20/25-50 cm	Acheulian level in a hard matrix of brownish calcareous silt
50 cm and below	Weathered limestone bed (natural soil)

The 45-50 cm Acheulian level excavated in the current season of excavation exposed over twelve hundred artefacts ranging from large cores to small waste chips. All these pieces as well as the limestone blocks forming part of the natural bed were plotted in order to reconstruct the original surface configuration of the spot and its use by the Acheulian groups (pl. 59). Within the excavated area of 70 sq m four chipping clusters were identified, each measuring about 8 to 10 sq m in extent and consisting of limestone cores, hammer stones, finished tools, artefacts in different stages of manufacture, and debitage (pl. 60). The major artefact types in the assemblage included cores, chopping tools on flakes, hammerstones, cleavers, handaxes, knives and scrapers.

In the 1998-99 season Trench 5 covered an area of 9 sq m and was excavated upto a depth of 10 cm below surface. Below a shallow deposit of black/brown silt (a few centimeters thick) a rich Acheulian cultural assemblage was found in the trench. In this season the trench was extended to cover an additional area of 11 sq m. The Acheulian horizon continued from 10 to 20 cm below surface and rested on weathered limestone bed. Thus the Acheulian level in this Trench 1 had a total thickness of about 20 cm. It consisted of limestone blocks and artefacts of various types including debitage, all found in a hard matrix *of* brownish calcareous sediment. From the fresh physical condition of artefacts and the occurrence of debitage and cores in various stages of reduction, it is clear that the area occupied by this Trench was also a part of the workshop and witnessed a tremendous amount of flaking and other activities connected with human occupation. From the 10 and 20 cm level excavated in this season a total of over three hundred artefacts were found. This year's excavation also yielded a small amount of fossil fauna from both Trenches 1 and 5. these included bones and teeth of *Bos* sp.

An important observation made during this season's work at the site was the four sub-localities existed at the site. These measured 300 to 400 sq m in extent and consisted of clusters of weathered limestone blocks of various shapes and sizes.

Plates 59-60



59



60

Isampur: 59, workshop-cum-occupation site showing Acheulian cultural material directly overlying limestone bed-rock, Trench I and 60, close view of artefact chipping cluster in Trench I

It is these clusters of limestone blocks which proved to be a real attraction to the Acheulian groups. It is presumed that each cluster was probably used/occupied by an extended family or a small group; these groups formed a larger band-like association.

The importance of the Acheulian site at Isampur lies in the fact that it is not only extremely well-preserved but the cultural material found on it gives us new insights into Early Man's selection of spots on the natural landscape as the focal points of his activity and various processes connected with technological organization.

30. EXCAVATION AT SRIRANGAPATNA, DISTRICT MANDYA

Jithendra Das, of the Bangalore Circle, of the Survey, assisted by Uday Anand Shastry, S.S. Nayak, M.H. Hadpad and B.K. Unnithnan, carried out excavation of the Ancient Palace site (Lai Mahal) with a view to exposing the extant palatial structure.

The site is situated approximately 200 m east of Sri Ranganathaswamy Temple and has a raised mound of nearly 2 to 3 m height with the remnants of a structure in brick and mortar and partly exposed plinth, which is identified as the extant palace of Tipu Sultan (1761 -1799). Buchanan, a British officer who visited Srirangapatna in 1800 described the structure in detail.

Only a part of this structure on the west was exposed earlier, shows a pillared-room of a hall and a flight of steps from the west. The work of scientific clearance of debris was taken up with an objective of exposing the buried structure.

The work during the year, laid bare extant western half portion of the palace. The exposed structure at its western extreme has a flight of nine steps with a landing at the fourth step, raising to a height of 1.80 meter flanked by out curved pillared-balustrade. The pillared-balustrade is built in brick and lime-mortar. The 6.5 m wide step at the bottom narrows down to 4.00 m as it ascends to the verandah of the palace at east. This verandah has an opening into a small room (6 X 5 m) at south. The verandah with the help of four steps, descends into a rectangular large audience hall (Darbar hall) at east measuring 42.50 X 20.00 m. At the extreme end of the hall at east are a pair of flight of steps separated by a distance of 2.00 m leading to an elevated rectangular room (16.00 X 4.00m) with an entrance to the south. Towards the south-east extreme of the audience hall, another flight of steps with a width of 1.50 m rising to a height of 2.15 m which might have led to the apartments of the upper story. Further to the north of this flight of steps a square plinth (2.5 m) and east-west running wall abutting it has created an entrance passage which at south opens into a large rectangular corridor (25.00 X 4.00 m) to the south of the palace-complex. This rectangular corridor at west opens further into another rectangular hall at south which might have served as guards room. Nearer to the steps leading to the audience hall at west, a flight of steps juxtaposed to each other is found respectively at north and south which reaches the upper story. These steps are found built into the longitudinal arm of the audience hall at north and south.

The flight of steps to the north-west of the Darbar hall open into a passage. The Darbar hall at north has three antechambers and a passage to four-pillared chambers. Each pillared-chamber measuring (12.50 X 9.00 m) has two rows of pillars at regular intervals, which are square in section. These pillars are constructed with bricks in lime-mortar. The easternmost pillared-chamber at south has a corridor, which opens at west into the passage leading to pillared chambers which in turn opens at east into Darbar hall. Excavation further east of the Darbar hall has laid bare a pillared-

rectangular hall (16 x 12 m) at east which opens into the southern corridor. All along the southern wall of this corridor at the eastern end is a drainage covered with slabs.

The floor of the Darbar hall, the verandah, the pillared-chambers and the wall surfaces are all plastered with lime-mortar.Further work on the east is essential to expose the complete layout of the palace-complex.

The antiquities retrieved are wide mouthed jars of different sizes and shapes of soapstone. Of the other interesting finds mention may be made of deluxe porcelain ware decorated in blue colour revolving around geometric and non-geometric, creeper and floral designs with occasional depiction human figures. The typology revolves around flat-based wide-mouthed bowls and platters. The other antiquities of importance are musket balls, cannon balls and nails of iron.

The pottery repertoire comprises coarse dull-grey and dull red ware. The ceramic typology included bowls, shouldered and carinated cooking vessels, plates, water-pots, mostly of non-ornate variety.

31. EXPLORATION IN DISTRICT MANDYA

Uday Ananda Shastry. of the Bangalore Circle, of the Survey, in the course of village-to-village survey, discovered the following antiquarian remains in Pandavapura taluk.

Locality	***Nature of remains***
Anavalu (12° 33'N; 76° 43'E)	Hero-stones and inscriptions Late medieval
Aralaguppe (12° 27'N; 76° 38'E)	hero-stones Medieval and late medieval
Baleattiguppe (12° 33'N; 76° 42'E)	hero-stones Inscribed medieval hero-stones
Bebigrama (12° 30'N; 76° 36'E)	Sambulingesvara Temple and hero-stone of thirteenth century
Chagashettihalli (12° 30'N; 76° 38'E)	
Chikanahalli Koppalu (12° 34'N; 76° 35'E)	Hero-stones of late medieval period
Chikkabhaganahalli (12° 33 ‘N; 76° 36'E)	Lower Palaeolithic tools: handaxes and scrapers on quartzite and quartz
Chinakurali (12° 33'N; 76° 36'E)	Late medieval hero-stones and inscriptions
Chittanahalli (12° 37'N; 76° 39'E)	Medieval and late medieval hero-stones
Damadahalli (12° 29'N; 76° 39'E)	Pond with a platform of moulded courses at the center
Doddabhoganahalli (12° 33'N; 76° 36'E)	Inscribed stone-slab of twelfth century
Eregandanahalli (12° 36"N; 76° 38'E)	Medieval and late medieval hero-stones
Gummanahalli (12° 33'N; 76° 35'E)	Hero-stones in a dolmen and inscriptions

Locality	*Nature of remains*
Halebidu(12°35'N;76°41'E)	Loose sculptures and inscriptions of Hoysala period
Hanaganahalli (12° 32'N; 76° 36'E)	Siva temple of post-Vijayanagara period
Haravu(12°28'N;76°37'E)	Kodandarama Temple of Vijayanagara period and loose sculptures of post-Vijayanagara temple
Harohalli(12°30'N;76°40'E)	Lakshminarayana Temple of post-Vijayanagara period
Mattiganahalli (12° 35'N; 76° 42'E)	Medieval and late medieval hero-stones Medieval and
Heggadahalli (12° 34'N; 76° 44'E)	late medieval hero-stones Inscriptions and hero-stones
Hosahalli(12°37'N;76°38'E)	of Hoysala period
Hosakote (12° 36'N; 76° 41'E)	Niskamesvara Temple with loose sculptures of Ganapati, Brahma, *Sapta-matrika,* Bhairava and Mahishamardini
Ingalguppe (12° 33'N; 76° 40'E)	Hero-stones and *sati-stone* of late medieval period
Kadaba(12°35'N;76°37'E)	Lower and middle Palaeolithic stone tools
Kadatanalu (12° 28'N; 76° 40'E)	Medieval and late medieval hero-stones
Kalenahalli (12° 34'N; 76° 45'E)	Lower Palaeolithic stone tools on the banks of Lokapavani river
Kamanayakanahalli (12° 36'N; 76° 37'E)	Damaged inscription
Kanaganahalli (12° 33'N; 76° 35'E)	Hanuman Temple of Vijayanagara period
Kodala(12°36'N;76°39'E)	Inscription of Vijayanagara period
Kenchanahalli (12° 32'N; 76° 38'E)	Inscription of twelfth century
Kurihatti(12°33'N;76°44'E)	Bhairava image
Kurubarabettahalli (12° 30'N; 76° 38'E)	Temple and inscription of post-Vijayanagara period
Kyatanahalli (12° 27'N; 76° 39'E)	Medieval and late medieval hero-stones
Laxmisagara(12° 34'N; 76° 39'E)	Lower and Middle Palaeolithic tools
Lingapura (12° 32'N; 76° 36'E)	Inscribed hero-stones of medieval period
Madarahalli (12° 30'N; 76° 36'E)	Ruined Bhairava Temple of medieval period
Manchanahalli (12° 35'N; 76° 35'E)	Loose sculpture of Bhairava, hero-stones, *sati*-stones and *nishidhi* stones of Vijayanagara period

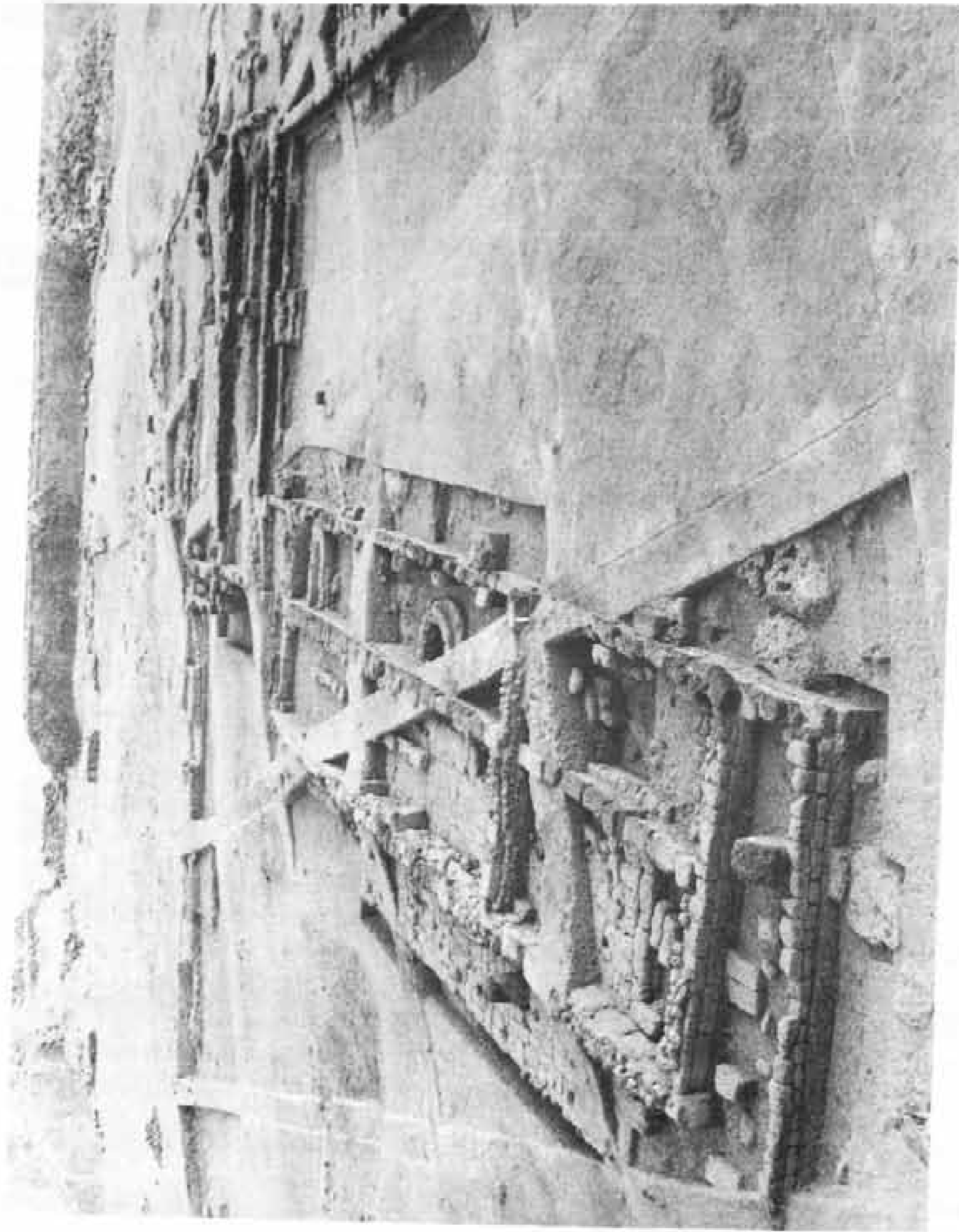
Locality	*Nature of remains*
Marmalli(12°37'N;76°37'E)	Lower and Middle Palaeolithic tools Inscriptions and
Marsanahalli (12° 33'N; 76° 36'E)	hero-stones of medieval period Inscription and *Sapta-*
Muddehalli (12° 31'N; 76° 34'E)	*matrika* panel of Hoysala period Rock-shelters and
Narahalli (12° 37'N; 76° 43'E)	Lower Palaeolitihic tools Hero-stones of medieval
Narayanapura (12° 37'N; 76° 38'E)	period
Nallahalli (12° 35'N; 76° 45'E)	Lower Palaeolithic stone tools on the banks of River Lokapavani
Nallenahalli (12° 36'N; 76° 37'E)	Lower and Middle Palaeolithic tools
Nilanahalli (12° 35'N; 76° 40'E)	Lower and Middle Palaeolithic tools
Ragimuddanahalli (12° 32'N; 76° 34'E)	Loose sculpture of *Sapta-matrikas* and hero-stones of late medieval period
Sanakahalli (12° 32'N; 76° 39'E) Sanaba	Inscription and medieval hero-stones
(12° 34'N; 76° 38'E) Shettihalli (12° 31'N;	Megalithic burials
76° 32'E) Somavarapete Koppalu (12° 37'N;	Lower Palaeolithic tools
76° 38'E) Sunka-Tonnur (12° 34'N; 76°	Medieval and late medieval hero-stones
43'E) Tonnur(12°33'N;76°38'E)	Ornate temple and Inscriptions of Hoysala period
Vidyanagara (12° 28'N; 76° 40'E)	Temple and Inscriptions of Hoysala period
Yelekere (12° 28'N; 76° 39'E) -	Memorial stone of eighteenth century
	Hero-stones of medieval and late medieval period

32. Exploration in Districts Haveri and Uttara Kanara

The Dharwad Circle of the Survey, under K. V. Rao and his team explored the following sites in two districts *viz.,* Haveri and Uttara Kanara

District	*Taluk*		
Haveri	Haveri	**Mathur**	**An early medieval inscription of Kannada characters**
-do-	**-do-**	**Naregal**	**An inscription in Telugu-Kannada characters of eleventh century**
Uttara Kanara	**Kumta**	**Mirjan**	**An image of Mahishasuramardini in black schist stone (fourteenth century)**
-do-	**Padavani** (in the **Temple of Santika Paramesvari Devi Temple)**		**An inscription in Malayalam characters datable to** *circa* **sixteenth century**

Plate 61



Fort Mirjan: exposed u-shaped structure

33. EXCAVATION AT FORT MIRJAN, DISTRICT UTTARA KANARA

The Dharwad Circle, of the Survey, under the direction of K. Veerabhadra Rao, assisted by K.V. Rao, M.Kalimuthu, A.V. Naganoor, S. Lingaraj, R.S. Athani, B.N. Byadagi and S.L.B. Desai, conducted excavation at Fort Mirjan, with a view to exposing the buried structure inside the fort besides unravelling the history of the fort and the role played by it in the maritime trade on the west coast.

The Fort Mirjan, roughly octagonal, was built over a laterite ridge near the stream Kudirehalla that joins the River Aghanasini. The slopes of the ridge were vertically cut to make a moat all around, so that the backwaters enter the moat during the high tide. The River Aghanasini joins the Arabian Sea to the west of Mirjan Fort. The fortification walls and bastions were built of dressed-laterite blocks. The walls have 'merlons' with machicolis for shooting arrows and also have space for walking above the walls. At the base of the fort there is a ledge all around The vertical cuttings have been lined with laterite blocks. There must be a drawbridge for access to the fort through the main entrance on the northern side. There are altogether four entrances, two of which lie on the western side and other on the eastern side that lead through the fortification walls to the moat. It is not known as to when it was built and the dynasty responsible for its construction as no inscriptions were found during the excavation. According to tradition, Mirjan Fort was built by Sharif-Ul-Mulk, a sardar of Bijapur Sultan who was incharge of "Ponda' on the west coast. Mirjan was an active port during the period of Vijayanagara kings and Domingo Paes who visited Bhatkal in AD 1520 says that most of the foreigners visiting the Vijayanagara kingdom landed at Mirjan. After the fall of Vijayanagara Kingdom it passed into the hands of the Bahmanis of Gulbarga, the Adilshahis of Bijapur, minor rajahs of Uttara Kanara, the Portuguese and finally to Hyder Ali. After the defeat of Tipu Sultan in the Anglo-Mysore war, it passed onto the hands of the British Empire.

Trenches were laid in the inner area of the fort to expose the buried structures starting from the eastern end to the western end. The excavation laid bare a number of laterite structure laying in north-south orientation. Of the structures, mention may be made of a large 'U' shaped structure measuring 35 m X 29.5 m facing north (pl. 61). It has an open courtyard in-between the eastern and western wings. The walls are built of dressed- laterite blocks using mud-mortar. There was no trace of lime-mortar. It has a cloister all around the courtyard supported by columns probably of dressed-laterite stones. Behind the cloister lie a row of chambers in each wing. The southern portion of the plinth is higher than the other wings. Each chamber has a flight of steps opening into the courtyard through the cloister. A number of tiles found here indicate that the superstructure was of wood with tiled gable roof using wooden trusses. Similar structures were also found at Hampi. This must be an administrative building so that the people can sit in the cloister and the Commander or the person in charge of the Fort can address the gathering from the southern side, which has got a high plinth. To the south-west of the 'U' shaped structure, burnt remains of black pepper and rice are found. The presence of saddle quern, iron pan, iron coconut scrapper indicate that it was a kitchen. On the western side of the 'U' shaped structure, there are many flimsy structures without proper foundation. A trough to the west of the 'U' shaped structure at a distance of 16 m falling in Trenches C4 and C3 is noteworthy. It was built of finely dressed-laterite blocks and must have been used for storing water for the horses. The lime-plaster to make it waterproof, and also the water carrier connecting it to the source are missing. A circular soakage-pit lined with dressed-laterite stones was also found in Trench B5 to the south-west of the first tank at a distance of 26 m. The source of water was naturally the stepped-well on the western side from which, water must have been drawn and

Plates 62-63



62



63

Fort Mirjan: 62, terracotta seals and 63, gold coin

Plates 64-65



64



65

Fort Mirjan: 64-65, *utensils of Chinese porcelain*

poured into the water carrier to supply water to the various destinations. The water carriers were in masonry, with dressed-laterite stones and whenever bed-rock was encountered, channels were cut into the laterite outcrop itself. Even for the disposal of sewage water, channels were cut into the lateritic outcrop itself. Even for the disposal of sewage water, channels were cut into the bed-rock and connected to the soakage-pit. A sub-terranean chamber cut into the bed-rock without any steps was found in Trench B4 to the south of square water tank at a distance of 12 m. The sides were lined with laterite blocks and the roof was covered by an arch. This might have been used as an ammunition dump. Many of the structures are found overlapping each other due to structural activities over a period of time, beginning from sixteenth century till eighteenth century and whoever was in the possession of the fort was using it for commercial gains through maritime trade, by imposing restrictions and levying tax on imports. About AD 1530 when their power was well established, Portuguese levied five hundred bales of rice *on* the Mirzie river.

The excavation also revealed canon shots ranging from 8.5 cm to 11.5 cm in diameter and weighing upto 10 to 15 kg. The other antiquities include copper and lead coins, terracotta sealing (pl. 62), Chinese porcelain with characters on the base and two copper finger rings apart from iron tools, like adzes, axes in various sizes, scraper, angler, hammer and iron nails.

The majority of copper coins (hundred ten in number) belong to the period of Hyder Ali, some of which, contain the symbols of elephant. The Arabic characters on the reverse are not clear. The clay seals were issued mostly in AH 1185 equivalent to AD 1769-70 containing the name of Rahman Khan Walad Ghazi Fahim. Nothing is known about Rahman Khan and the purpose of his seals. He may be one of the Generals of Hyder Ali. An important finding of the excavation is a Portugurese gold coin (pi. 63) minted at Goa in AD 652. On the obverse of the coins is a coat of arms and around it is the legend *Rex Portugaliae,* On the reverse is an effigy of St. Thomas with a club in his left hand. The letters Saint Thomas are faintly visible. At the time when it has fallen into the soakage-pit, it was being used as a pendant by soldering a small ring to it, which is also gold. It weighs 3.79 grams and is 1.9 cm in diameter. The coin was issued by Portuguese Viceroy Conde De Sarzades (AD 1650-1660) during the reign of Monarch De-Joao-IV (AD 1640-1656).

The ceramic evidence mainly shows the use of red and black wares of medium fabric in addition to the deluxe Chinese porcelain in the form of plates and bowls with designs of peacock and dragon painted in blue colour inside (pis.64-*65).*

The other miscellaneous items include canon balls in various sizes, dumbles, copper rings, handaxes, a gun, keys, hooks, knife, ladles, stirrup in different sizes, besides nails and clips.

KERALA

34. EXCAVATION IN PERIYAR RIVER VALLEY, DISTRICT ERNAKULAM

During the season, the explorations were carried out by the Thrissur Circle, of the Survey, under T. Satyamurthy in Keerampara village, District Ernakulam. Antiquarian remains of six temples datable between the seventh and the tenth century were discovered. The plinth of these temples depicts the early feature of Kerala temples. It is interesting that the dentil like projections above the *kumuda* over the plinth of the temples resemble Thondaimandalam Tradition and are datable to the seventh-eight century. In the same village series of megalithic burials, cairn circles and urn burials were discovered.

35. EXCAVATION AT BKKAL FORT, DISTRICT KASARGOD

In continuation of the previous year's work *(1998-99,* pp. 73-74), the Thrissur Circle, of the Survey, under the directions of T. Satyamurthy, assisted by Krishna, T. Samuel Joshuva, S. Ravichandran, M. Nagendraswamy and K. Somanna resumed excavation at Bekal Fort. The excavtion in Sector I-A (during the year 1997-98) revealed the existence of an ancient habitation inside the fort with the streets running north-south and east-west. The significant discoveries in this sector include a Hazur of Tipu Sultan and typical Kerala houses of Nalukettu plan.

The western side of the inner fortification, i.e., the area in I-B, north of Sector I-A was taken up for investigation during this year which revealed a three-tiered rectangular structure (17.2 m X 12.7 m) constructed with laterite blocks. The height of the lowermost platform is 0.7 m, the middle level platform is 1 m and the top platform is 1.35 m from the ground level. The width of the lower platform is 3.75 m and the middle and top are 3.85 m and 5.90 m respectively. The entire structure is facing north with the topmost tier forming a rectanglular structure of 18.35 X 5.90, the middle 8.35 X 3.85 and the lower 18.35 X 3.75 respectively. There are *bhadra-like* three projections in the second tier towards north. The first tier and middle tiers are paved with mud-plaster while the topmost tier is having a laterite floor. There are impressions of square bases over the platforms indicating the existence of wooden pillars and superstructure above the excavated remains. Interestingly, one such pillar with wooden base is still intact on the topmost tier.

There are thirteen courses of laterite blocks in the western side indicating the massiveness of the superstructure that existed above this. The entire complex excavated resemble the Daria Daulat Palace of Sultans of Srirangapatna as indicated by the discovery of seventy-five coins of Tipu Sultan's period and one hundred and fifty copper ingots.

In the southeastern corner, a kiln was discovered and adjacent to it, a well, scooped in laterite out trap was unearthed. A closed drainage on the eastern side indicated the sanitary arrangements. Other antiquities encountered include a golden pendant, iron cannon balls and parts of iron cannon.

It is noteworthy that Sector-I of Bekal had yielded all antiquities of Tipu Sultan's period and they are conspicuously absent in Sector II. In the later, antiquities pertaining to Nayaka period were encountered.

MADHYA PRADESH

36. EXCAVATION AT BIJAMANDAL, KHAJURAHO, DISTRICT CHHATARPUR

In continuation of the previous year's work (*1998-99,* p. 87), P.K. Mishra, assisted by Narayan Vyas, N. Taher, Rajani Mishra, Manuel Joseph, Shambunath Rajbher, R. Moovendran, Jagdish Prasad, O.B. Khobragade, R.K. Shrivastava, K.K. Rai, Nitin Shrivastav, C.K. Bhanarkar, Ramesh Thakur and Awadesh Sinha, of the Bhopal Circle, of the Survey, resumed excavation with a view to exposing the other components of the temple as well to expose *the jagati.*

After exposing the moderately undulating top portion in the preceding year, the sides were taken up, culminating in baulk removal. The entire architecture, consisting of the *garbhagriha, antarala, maha-mandapa, mandapa* and *arddha-mandapa,* on plan, was revealed. The extant remains are of *pitha* and *adhishthana* mouldings of the temple. The lowest of these are resting on coarsely-dressed rocks intended to remain under the soil. Above this roughly-chiselled blocks are mouldings *of kharasila, bhita* with frieze of floral motifs, *karnika,* ornamented *kumbha, jadya-kumbha, karnika, grasapatti* and *antarapatra* (pl. *66).*

Plates 66-67



66



67

Bijamandal: 66, exposed mouldings of the temple and 67, seated image of Sarasvati

Sculptures of various gods and goddesses were also found within the debris besides a few which are still *in-situ*. The most exquisite is the Sarasvati figure on the southern facade of the *maha-mandapa*. Another sculpture with *jatamukuta* type of head-dress holds lotus buds, in its two upper hands. Prominent sculptures in the *antarapatra* moulding include Jaina Tirthankaras, social scenes, elephants and horses. Several sculptures were found in semi-carved state within the debris of the mound. Interestingly, the unfinished sculptures like Jaina Tirthankara and Sarasvati (pi.67) within the mouldings and other sculptures in the debris besides the extant remains of brick ramp show that the temple building had to be abandoned midway.

Following the exposition *of the pitha* and *adhishthana* mouldings of the temple the *jagati* was also exposed. On plan the temple has offsets parallel to the *garbhagriha, maha-mandapa* and *mandapa*. The entire moulding of the *jagati* was found to be resting on coarsely chiselled-blocks. Over which there are two courses of rough chiselled-blocks. It is superimposed by an ornamented *kumbha* with the same band of design, seen at *adhishthana* level. Superimposing this course lies the *jadyakumbha*. The continuity of this course is broken by the lowest moulding of the *rathika* niches. The highest extant moulding here has similarity with *grasapatti* but instead of *kirttimukha* has flowers surrounded by stereotyped necklaces.

Besides many loose, damaged sculptures, clamps and two chisels were the other antiquities recovered from the debris.

37. EXPLORATION IN DISTRICT DAMOH

P.K. Mishra, assisted by Narayan Vyas, N. Taher, Manuel Joseph, R.K. Shrivastava, O. B. Khobragade, N.S. Pawar and Avadesh Sinha, of the Bhopal Circle, of the Survey, in collaboration with the Department of Forest, Government of Madhya Pradesh, surveyed the forests of the district. During the course of the survey a variety of archaeological remains were observed which include Palaeolithic tools, remains of temple and stupa besides fort and *sati*-pillars.

In the fort of Singorgadh, besides prehistoric tools, remains of ancient street and houses on two sides were found. Important finds include pottery sculptures, *sati*-stones, dated to twelfth-thirteenth century, tanks and a few courses of circular structures, possibly the lowest course of the stupa.

The area between the villages of Doni and Aloni, separated by about 5 km yielded various types of archaeological remains. Some temple pillars ascribed to the Gupta period are the earliest finds form this place. Several temples of Pratihara and Kalachuri period were also seen here. Many 5tf//-stones with a height ranging from 8" to 10\ has been ascribed to twelfth-thirteenth century AD. In the village Bawan Bajoriya ruins of a large ancient settlement was noticed. Large amount of lamps and other potsherds were found, datable to the fifth-sixth century.

In the vicinity of Bansipur village which is located between Nohata and Sangrampur. several Buddhist sculptures were noticed. Some stupa remains, a large reservoir, a few embankments were the other remains. The anthropogenic remains of this place range from the fifth to the tenth century. Temple remains ascribed to Pratihara and Kalachuri periods were traced from Bandakpur about 15 km from Damoh. Important sculptures from this place include those of Ganesa. Varaha and Vishnu.

Near Chourai village three Gupta period temples were brought to light. These were built of bricks but due to brick robbing the plan is almost lost.

In Khari Deori, located about 12 km away from the village Taradei, three types of archaeological remains were noticed, the most prominent among them is the large Vishnu temple. Near the temple there are images of *Vamanavatara,* Vishnu, *Ashtadikapala* besides architectural remains. There is a tank in the adjoining area built of earlier structures. The tank contains the sculptures of Ganesa and Vishnu. The area also has large structure built by the Gond rulers.

In Tejgadh, a village about 40 km east of Damoh, were noticed an ancient sculpture in a new temple, remains of fort, a large tank and parts of architectural remains of fort, a large tank and parts of architectural members of temples. At Mohar, there is a *sati*-pillar which on the basis of partly defaced inscription is ascribed to the thirteenth century. In Village Mohad, approachable through Ghorkha village, there are three groups of temples. The most important among these groups is devoted to Surya.

The Village Bairagadh has remains of a large temple of Kalachuri period. Some of the sculptures found scattered here are of: Durga Mahishasurmardini, dancing Ganesa, Hanumana, Nandi and Sardula. A pillar shows battle scenes on it and perhaps was built to commemorate a dead warrior.

In Grampura located near Bairagadh, there is a Pratihara temple containing some loose sculptures of the Kalachuri period. Some of the prominent sculptures are of Vishnu, Mahishasurmardini, a female deity and a lion. This village was in existence during the eighth-ninth century AD which is indicated by the presence of Gadaiya coins located between Tajgadh and Sangrampur. There is a sculpture of Hanumana located in the village Khamaria.

Nohata, a prominent village located between Damoh and Jabera, has a Jaina temple on the hill to the west of the settlement. There are three images of Adinatha ascribable to the eleventh century. In Baduguan-a village about 12 km east of Nohata, there is a group of temples from the extant remains, much of which are lying scattered. The prominent sculptural remains include Ganesa, *Trivikrama* form of Vishnu, the architectural remains of the largest temple such as *amalaka, varandika, khura, jadyakumbha, kalasa* and *antarapatra.* The temple is *pancharatha* in plan. The other temple remains also have similar architectural remains and sculptures like that of Ganga- Yamuna, Vishnu and *Dikpalas.*

The village Chopda is about 20 km from Nohta. There is evidence of some temple here. In the hub of the village there is a Jaina temple with a 15 feet high standing image perhaps of Santinatha. The illegible inscription is dated to the thirteenth century. There are several other sculptures of standing and seated Tirthankaras. Some sculptures with Saivite affinity were also found nearby.

In Bhangadh, there are extant remains of a fort dated to the Gond period. It also has evidence of residential structures most of which are destroyed. Some structures of *lakhauri* bricks were also noticed. In Usmi Balwada, located in inaccessible jungles, the remains of a large temple besides an image of Hanumana was noticed.

38. EXCAVATION AT KARONDIA, DISTRICT DHAR

Excavation at Karondia (22° 4' N; 74° 49' E), was undertaken by Sonali Naik, during her visit to Kapadkhera excavation being carried out by the Prehistory Branch, of the Survey, Nagpur, under the direction of S.B. Ota. The excavations were carried out by Sheila Mishra and R. Mohanty of Deccan College Post-graduate and Research Institute, Pune, assisted by Sonali Naik, Gurudas

Shete, Utpala Adav, Vaishali Kathale (research scholars) and Sushma Deo and P.P. Joglekar, along with the help of technical staff, R. Dhamapurkar, Waghmore, Rokade and A. Omle.

This site was selected for excavation because of its possible submergence in the Sardar Sarovar dam.

The site is in the gullied alluvium between the Narmada river and the village Karondia, known by the villagers as "Dabala Berdia" after a small shrine at the site. It is about 200 m upstream of the village. The area to the east of the site is gullied alluvium while to the west of the site there is an open field. Flood waters of Narmada enter the gullies and cover the field during the highest floods.

A 5 m X 5 m grid over the site was laid. On clearing the outlines of pits, post-holes were noticed and mapped. Nineteen pit outlines were found of which seven were excavated from which were collected pottery, bones and charcoal. The pits were dug in two halves to allow the stratigraphic profiles to be drawn and soil samples to be collected from the different layers. One of the rubble platforms was selected for study. This was mapped and the material collected.

Two trenches were taken up in the gullied alluvium on the east of the site. These trenches showed that the rubble platforms were within the alluvium. This was a totally unexpected finding. Before taking these trenches, it was thought that the alluvium was deposited during the Late Pleistocene, with the Chalcolithic activity of the gully surfaces. This was because at Nawarkheda, and Kapadkheri, Upper Palaeolithic arefacts are found eroding from alluvium, similar to that from which the Chalcolithic rubble platforms are eroding in very close proximity.

However the evidence from the trenches at Karondia very clearly shows that the Chalcolithic rubble platforms are within the alluvium which has been gullied after the Chalcolithic period. This indicates a widespread phase of Narmada aggradation during the Chalcolithic period. Many of the unusual features of these sites are explained by this fact. The Chalcolithic people did not select badland areas for settlements but occupied the bank of the Narmada within the area affected by floods.

One trench was taken up in a gully, closer to the River Narmada. Here the alluvium with the Chalcolithic artefacts had been eroded and a subsequent aggradation was seen. At the river bank over 10 m thick recent brownish sandy silt was found. All the alluvial units were sampled for thermoluminescence dating.

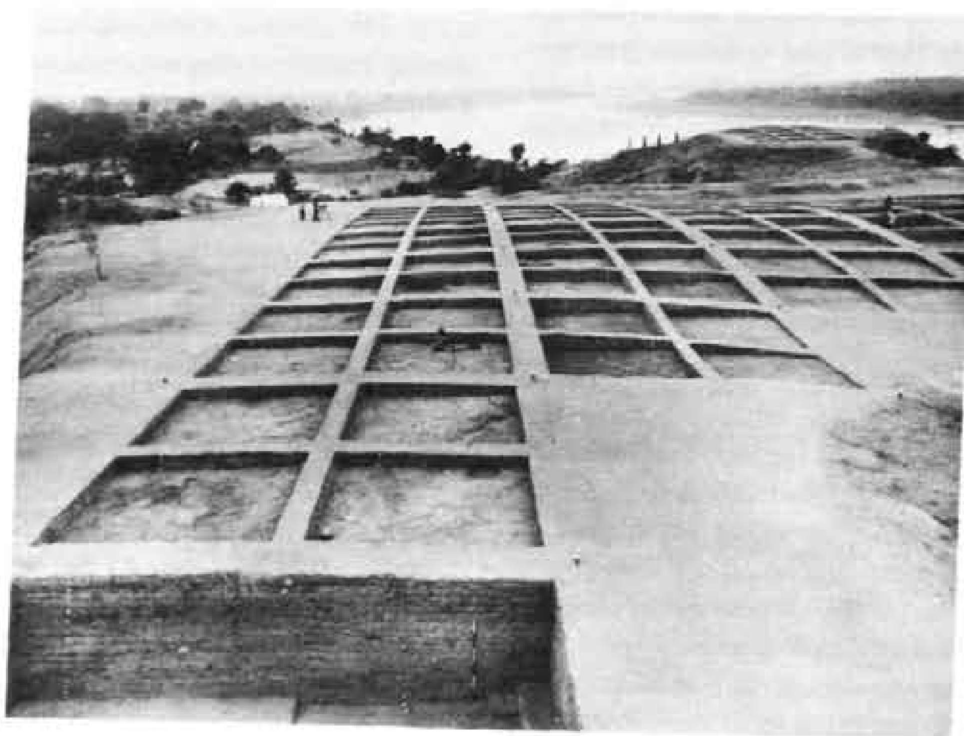
Pit 1 on the upper surface of Karondia showed very interesting evidence. After scraping, a series of seven post-holes, surrounding the pit could be clearly seen. The pit itself is 1.52 m in diameter and 1.6 m in depth. The pit deposits appear to belong to different episodes of use separated by thin layers of yellow silt. This implies that flood silts have intervened between episodes of occupation. At 1 m depth a smaller pit was seen within the bigger. This evidence from Pit 1 supports the idea that it is a dwelling pit, occupied seasonally, with episodes of river deposition alternating with the accumulation of habitational debris.

Pit 2, to the north of Pit 1 (away from the river) was 1.22 m in diameter and 90 cm deep. At 50 cm depth a hearth was found. Pit 3 was 1.24 m in diametre and 90 cm deep, Pit 4 was 87 m in diametre and only 10 cm deep. It is close to Pit 3 and may be a feature associated with it. Pit 5 was 1.56 m in diametre and 50 cm deep. Within this 50 cm two episodes of occupation could be seen. Pit 6 was 1.41 m in diametre and 62 cm deep and Pit 7 was 1.57 cm in diametre and 1.6 m deep.

Plates 68-69



68



69

Chichali: 68, general view (CHL I) from the west and 69, general view (CHL I & II) from the east

One of the most interesting finds of this excavation was the pottery from the pits differed considerably. The pottery from Pit 7 belongs to the late early historical period with coarse fibre tempered red and black wares, some incised and applique designs and no painted pottery. Microliths were not found in this pit. Pottery from the other pits is almost similar to pottery of chalcolithic types but even then there are clear differences in style of pottery between the different pits. Detailed study of these assemblages is in progress. However in Pits 1 and 2, red as well as black painting on red ware, burnished red ware, burnished grey ware and black and white ware are present. Interestingly, one sherd from Pit 2 has a typical Savalda motif, showing rows of small upside down "V"s. This is done in a red pigment on a red-slipped globular pot. None of the pottery assemblages is very close to the "Malwa" pottery reported from Navdatoli.

39. EXCAVATION AT CHICHALI, DISTRICT KHARGONE

In continuation of the previous season's work *(1998-99,* pp. 92-107), the excavation Branch-I, Nagpur, of the Survey, under the direction of S.K. Mittra, assisted by N.C. Prakash, Ch. Babji Rao, Prabhas Sahu, N.K. S. Sharma, H.J. Barapatre, D.K. Kasbi, S.B. Suple, S.K. Gulrandhe, S.M. Khairkar, R.G. Nagulwar, S.B. Bhoyar, A.E. Keshwar, D.A. Kamble, Shahid Aktar, M.M. Dahake, S.A. Raut, M.R. Kambe, R.G. Patil, Sunil Korde, R.S. Sharma and PC. Dendwarl resumed excavation at Chichali (22° 08'N; 75° 22'E) with the objective of ascertaining the chronological frame work, arrived at last field season in the limited work and to bring to light more structural evidence with regard to Ahar, Malwa, Jorwe and early historical periods. In all twenty trenches at CHL I and three at CHL II were subjected to horizontal excavation including the western annexe of `Ghosai Tawda' (pls. 68-69) resulting in the discovery of abundant cultural material of respective periods. The Chalcolithic occupation at the site is further confirmed as at Ahar, Malwa and Jorwe which lasted upto the advent of early historical times.

The cultural sequence in both the mounds found to be identical except little variation in their total deposit

At CHL II cuttings of YJ2, YK2 and YL2 have produced evidence of larger occupational deposit of Ahar period (Period I) than at CHL I as substantiated by the occurrence of large quantity of white painted black-and-red ware. The elements of structural evidence pertaining to this period, noticed at the site in general, were squarish or rectangular, single, multi-chambered houses with common mud wall in-between, supported by a series of wooden posts. Evidence of a boundary wall was also noticed from the cuttings of E4 (pls.70-71). One of the house floors contained a hearth and two stone mace-heads (pi.72). Steatite beads, saddle querns and *in-situ* ceramics were commonly found. Principal ceramic types of this period were white painted black-and-red ware invariably confined to the shapes like bowl and dish with three different surface treatments; black painted buff ware available in shapes such as vase and bowl besides red ware, incised red ware and dull red ware. The other ceramic veriety noticed was of medium to course fabric, plain black-and-red ware confined to the shapes such as dish and small bowl. The other associated material noticed were slender bodied horned, humped bull resembling Harrappan example, beads of jasper, steatite, shell and decorated terracotta. Large quantity of charred grains of wheat, cereals and pulses; microlithic blades and animal bone fragments were also collected.

In Period II, the Ahar culture was closely succeeded by the authors of Malwa culture. Larger area of the site was inhabited by the authors of this culture; considerably for a longer period. The structural evidence, pertaining to this period was

Plate 70

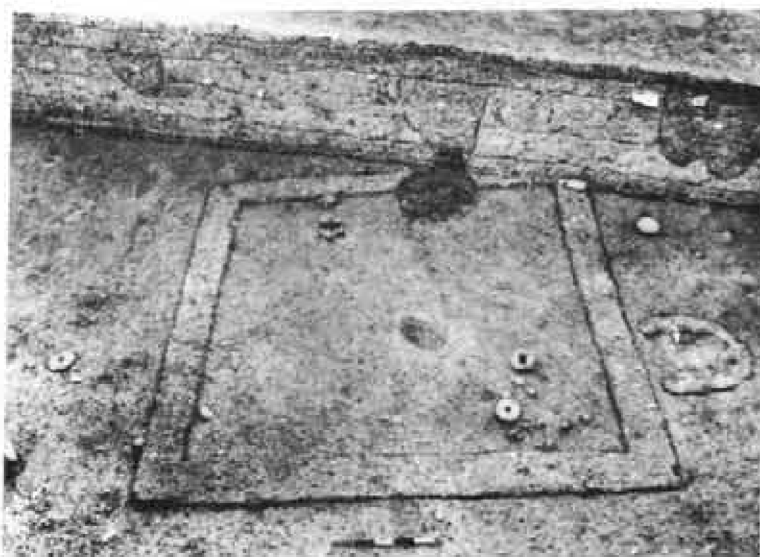


Chichali: community wall with post-holes and a door opening to the right Trench E4

Plates 71-72



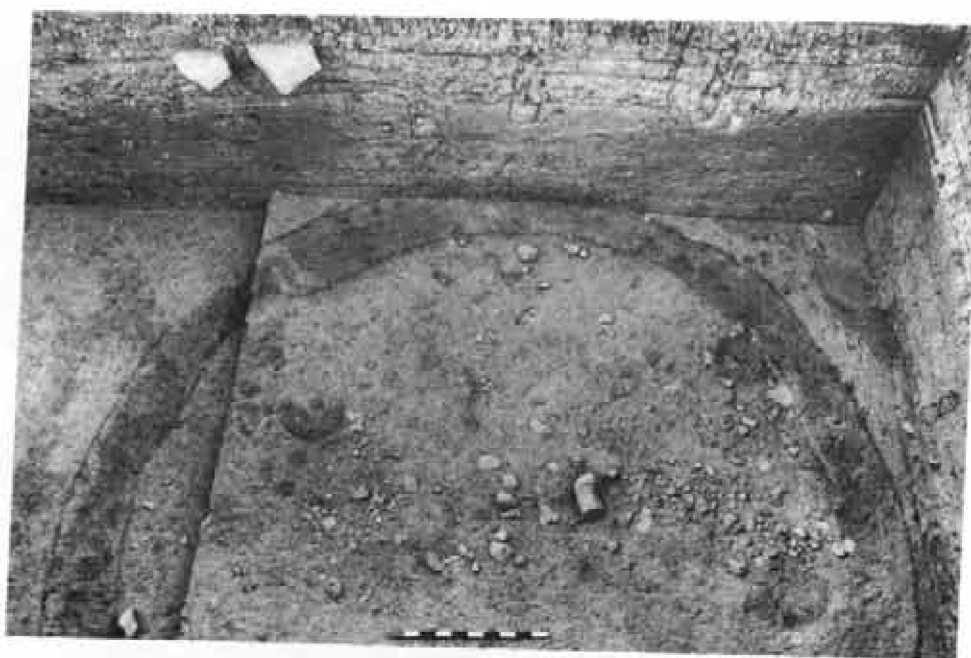
71



72

Chichali: 71, close view of community wall cross-section showing depth of post-holes and 72, house plan with hearth and in-situ mace-heads, Ahar period

Plates 73-74



73



74

Chichali: 73, circular house plan, early Malwa level and 74, multi armed hearth, Malwa period

Plates 75-76



75



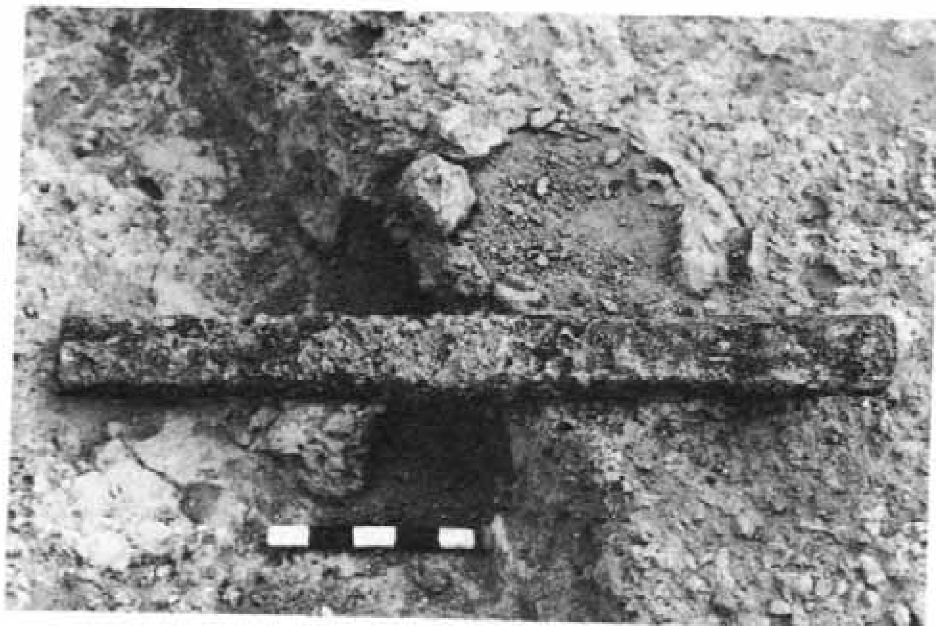
76

Chichali: 75, twin pots in-situ, mid Malwa level and 76, three storage pots in-situ

Plates 77-78



77



78

Chichali: 77, pots with lid, in-situ, mid Malwa level and 78, copper chisel, in-situ, Malwa period

noticed from a number of cuttings. The house plans noticed were circular (pl. 73), squarish and rectangular mostly in east-west orientation. The mud walls were usually provided with wooden posts in order to strengthen the wall and to bear the load of superstructure. This practice was continued from its preceding culture. Majority of exposed house plans contain multi-armed hearths (pl. 74). The floors were evidently preferred with mud-plaster. This period has witnessed the advent of bright red ware which is otherwise a prime characteristic feature of Malwa Chalcolithic phase. Besides continuation of certain ceramic traits of the preceding periods, black on red ware, red-slipped ware, dull red ware, chocolate-slipped ware and grey ware constitute the major ceramic types. Their shapes normally are large sized storage-jar, vase, dough plates, dish-on-stand, challice, chanelled-bowl and elongated jar resembling Harrappan type (pl.75). There are varieties of design elements adopting motifs like flora, fauna besides geometric patterns. Series of either human or animal (either deer or stag) motifs usually appear on dish-on-stand, bowl and vase. Many of the cuttings yielded intact *in-situ* pots with house plans (pl.76). Significant amongst the finds of this period were a large corrugated jar with short rim, elongated neck, obliquely falling sides and saggar base and thick-slipped decorated shoulder of bright red ware; and double pots *in-situ* (pl.77) with lids, one with inverted dish while the other covered with topsy turn fragment of dish-on-stand. Important associated finds noticed here include a large-sized copper chisel (pl.78), *parasu*-like object, fish-hooks, rods and bits of copper; terracotta animals; beads of steatite, agate, stone, shell, bone and terracotta; besides antler and animal bone fragments; charred grains of wheat, barely, black gram, green gram and ber (Indian jujube) and microlithic blades of slender types.

During the Jorwe period (Period III), which succeeded the Malwa culture, the site witnessed sea changes in construction pattern of dwellings and ceramic production. Evidence of large multi-chambered house-complex was noticed on plan from a number of cuttings. The floors and walls of the houses were mud-plastered and subsequently burnt in order to strengthen the structure. Some method of burning the earthern plaster was also followed for floor. The floors were repaired successively as evident from the cuttings of C3 and B3, wherein more than five successive repairs of the floor was noticed. The walls were also decorated by stamped motifs (pl.79). Apart from squarish and rectangular house plans, circular house plans (noticed in previous season's work) were also traced. Invariably all house plans contained traces of burnt wooden posts demarcating the wall and the floor area. Some of the exposed house plans contain cluster *of in-situ* pottery. The other structural remains noticed at a number of cuttings are hearths of different size and shapes. The house walls were usually raised over pebble paved foundation. Also available are pebble paved pathways. The ceramic industry of this period is essentially red ware, black painted red ware of fine fabric and thin sectioned red ware. Continuation of bright red ware and incised red ware of preceding periods were also noticed. Apart from red ware, orange coloured ware of medium fabric, dull red ware, red-slipped and chocolate-slipped ware, grey ware were also present. The important shapes noticed were long necked globular-bodied pot, vase with flared rim, flask-like vase, dish-on-stand, deep bowl, challice, decorated channelled bowl, *handi* and miniature pots. The painted designs generally comprise geometric and floral motifs. There is occurrence of a new design element of rising sun and various types of sun motifs in this level abundantly. Majority of pots bear graffiti marks. Large globular-bodied red ware pot with applique

Plates 79-80



79



80

Chichali: 79, fragmentary wall plaster with stamped motif, Jorwe period; and 80, in-situ storage-jar with applique decoration



81



82

Chichali: 81, *remains of wooden post inside the post-hole, early historical period and* 82, *general view of tile kiln, CHL II, medieval period*

concentric circles and series of standing human figures is one of the most important finds of this level (pi. 80). Associated finds include terracotta human and animal figurines; copper fish-hooks and antimony rods; beads of agate, chalcedony, carnelian, steatite, shell and stone; shell bangles, querns, mullers and polishers in stone. A large quantity of microliths are other important finds of this level.

Period IV is early historical, marked by the advent of iron and black-and-red ware which succeeded the Jorwe cultural phase almost without any gap. Some of the preceding cultural traits *viz.,* pottery types and design elements etc., continued. New ceramic types like black-and-red ware, and burnished black ware were introduced. Fine fabric red ware, medium-to-coarse dull red ware, red and chocolate-slipped ware, were the main associated ceramic types of this period. There was a marked change in structural pattern adopted by the authors of this culture. Circular, squarish and rectangular house types were preferred. Lime was one of the important components for floor. Lime floors with a series of post-holes were commonly noticed through a number of cuttings. Hearths, legged-querns and circular bins are invariably associated with house plans as also *tandoor-like* hearths. Cutting C4 produced a damaged furnace and a circular lime-floor that was in use for a longer period as evident by the traces of repairs. Pebble and rubble were used for the walls, floors and platforms. Cutting D4 yielded *in-situ* wooden post, fairly in good condition (pi. 81). The occurrence of antiquities is more frequent than the preceding period. Iron objects like hoe, arrow-heads, points, clamps and nails; antimony rods, fish-hooks, points and ornaments in copper are some of the important metal objects unearthed in this period. The other important antiquities of this period are terracotta figurines, ear-studs, spindle-whorl, gamesmen, net-sinkers and skin rubbers; various types of beads of carnelian, agate, chalcedony, jasper, chert, crystal, lapis lazuli, shell, bone, stone, terracotta and glass; shell bangles, combs, stylus, points and human figurines, in bone and ivory; bead polishers, grinders, pounders and sling-balls in stone; and large quantity of animal bone fragments. Charred grains of cereals and pulse in small quantity were also noticed.

The excavation at CHL I and II indicated the preference of CHL I during early historical times for habitational purpose, as no structural evidence of this period were noticed at CHL II. However, one tile kiln of medieval period was exposed at CHL II (pi. 82).

In the absence of C14 dates, on comparative study, the dating of various periods could be placed tentatively as under:

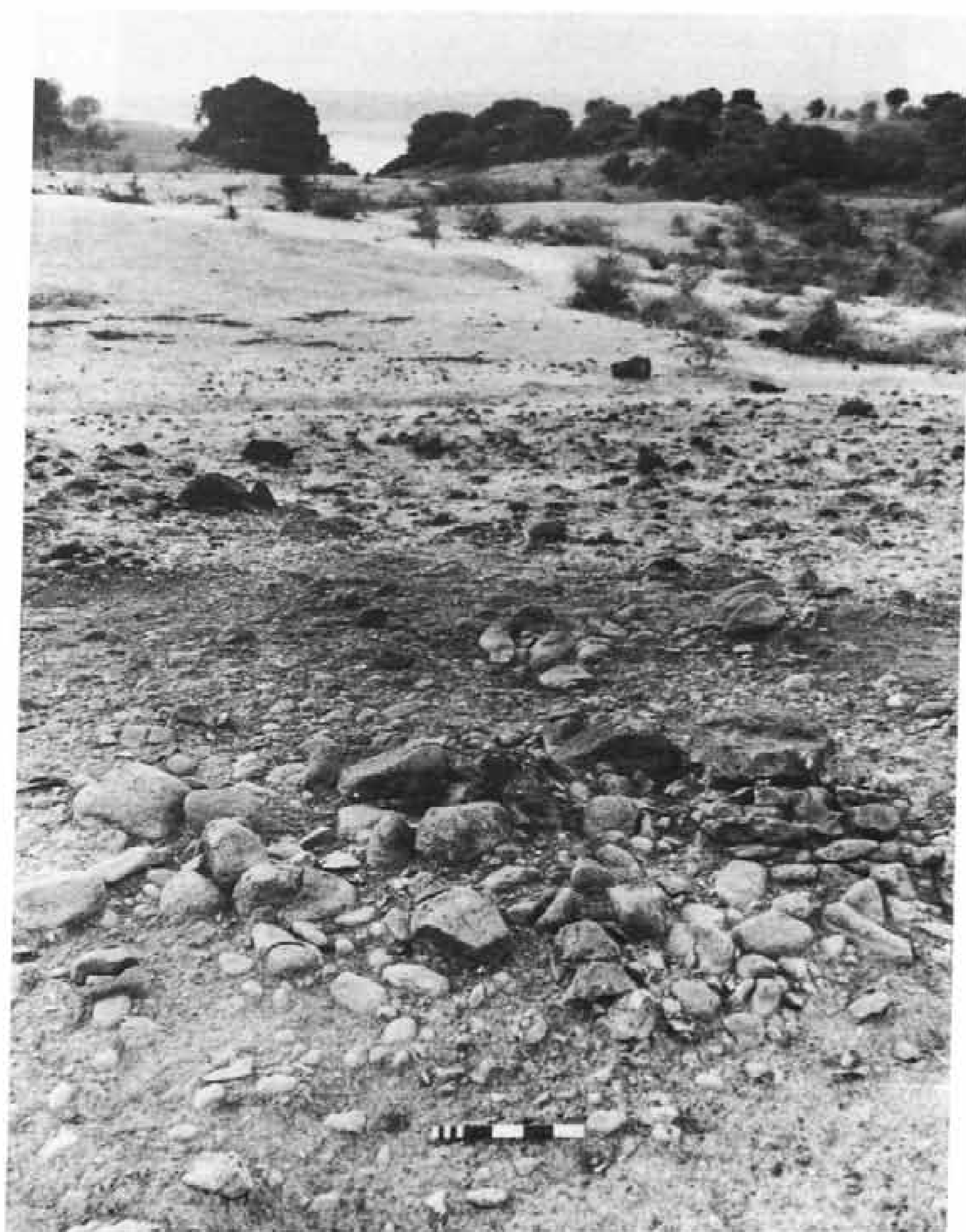
Period I	c.2000tol800BC
Period II	*c.* 1850 to 1100 BC
Period III	*c.* 1100 to 700 BC
Period IV	*c.* 700 (pre) and second century BC

Details of species of flora and fauna besides C 14 dates, retrieved from the excavation would be made available after proper study at respective institutes.

40. EXPLORATION IN DISTRICT KHARGONE

In continuation of the last year's work *{1998-99,* pp. 92-97), the Prehistory Branch, Nagpur, of the Survey, under the direction of S.K. Mittra, assisted by Shivananda V., K.M. Girhe, R.K. Dwivedi, Pyara Singh, N.K. Nimje, Ghayasuddin, Indira Tiwari, P.S. Pashine, P.C. Dogra, Ashok Gadekar and M.S. Kadao, carried out explorations in and around Chichali and discovered many Stone Age sites, assisgnable to Lower Palaeolithic, Middle Palaeolithic and mesolithic periods. The tools types comprise handaxes, cleavers, choppers and chopper chopping from Lower Palaeolothic, scrapers of various types, small handaxes, discoids,

Plate 83



Chichali: general view of Palaeolithic factory site

Plates 84-85



84



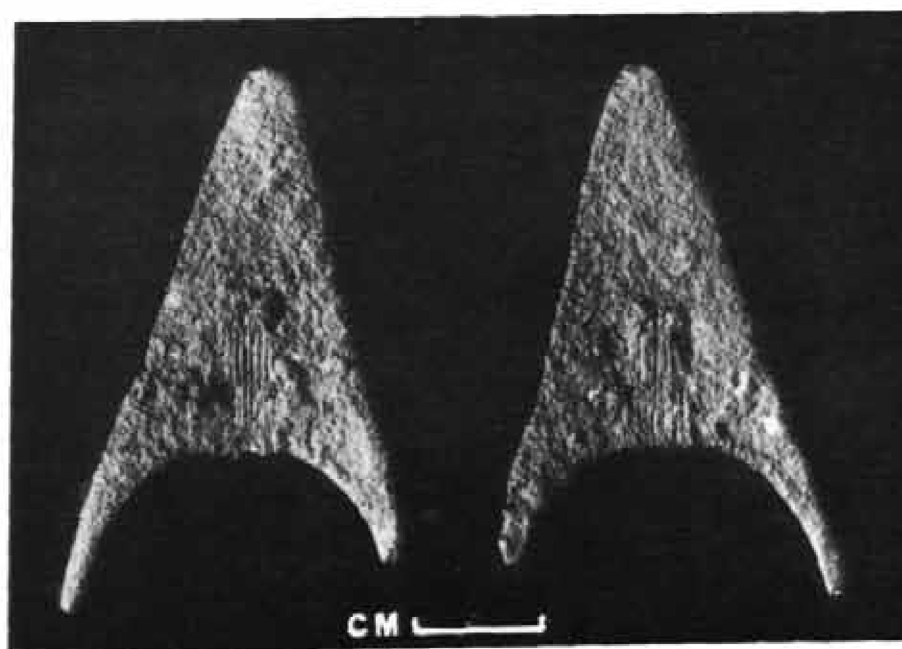
85

Chichali: 84, *in-situ cleaver and* 85, *small handaxe*

Plates 86-87



86



87

Chichali: 86, fully exposed pit and 87, copper barbed arrow-head

from Middle Palaeolithic and points, tanged arrow-head and cores from mesolithic levels.

The Palaeolithic factory site, situated on the bank of Sukli Nallah, a tributary of the River Narmada was also taken up (pl. 83). The excavation yielded good specimens of Palaeolithic tools in different stages of manufacture. The tools comprise cleaver (pl. 84) small handaxe (pl.85), scrapers, belonging to Middle Palaeolithic age, besides waste flakes of chert, quartzite etc.

In continuation of the last year's work *{1998-99,* pp. 92,97), S.K. Mittra, along with his team carried out digging at a megalithic burial site (with the assistance of Excavation Branch-I, Nagpur), situated on the southern side of Chichali-Nimrani road, opposite to the megaliths excavated last year. The megalith is oval in shape and is the only one of its kind and the largest of the recorded megaliths, measuring 18.5 m north-south and 12.5 m east-west.

Two burial pits, one each on the northern and southern sides were noticed at a depth of 85 cm from the top of the cairn filling. The one on the southern side was cut through the bed-rock to a depth of 45 cm which measures 165 cm in length east-west and 75 cm in width north-south. An articulated skeleton was placed inside the pit in east-west orientation, the head towards the east. Some bones of the skeleton such as the skull portion, lower mandible, long bones, tibia, fibula, radius, ulna, tarcel, metatarcel, foot finger bones and teeth were retrieved from the excavation (pl. 86). The bones found were very fragile. The associated grave goods include black-and-red ware bowl, red ware pots and two grooved bone objects.

The burial pit on the northern side was 5.5m north of southern pit cut through the bed-rock upto a depth of 65cm measuring 170 cm east-west and 75 cm north-south. Fragmentary fragile skeletal remains in the east-west orientation were encountered. These comprise a few bone pieces along with portion of lower mandible which were placed towards the east. A significant discovery in the form of a barbed copper arrow-head was found inside the grave pit kept near the broken mandible (pl. 87). Similar copper arrow-head is reported from Baghor in Rajasthan and Dholavira in Kachchh, Gujarat, in Chalcolithic context.

41. EXCAVATION AT SIRPUR, DISTRICT MAHASAMUND

Jagat Pati Joshi and A.K. Sharma, assisted by Julfiqur Ali, Reema Sobti, J.S. Dubey, carried out excavation at Sirpur (21°20' N; 82° 11' E), under the aegies of Bodhisattva Nagarjuna Smarak Sanstha Va Anusandhan Kendra, Nagpur to the south of Raikera tank. Two potential areas designated as SRP-I and SRP-2-2000 were probed.

SRP-1 2000 is located inside a fortified area on the southwestern part. This season's dig conducted in 700 sq m area to a depth of 2.5 m revealed a west facing Buddha Temple along with vihara upto the plinth level while the super structure was of bricks measuring in size from 42 X 22 X cm, 36 X 20 X 7.5 cm and 29 X 23 X 8.5 cm (pl. 88). The entire complex is built of dressed-blocks of schist. The temple besides the centrally situated *garbhagriha* consists of a subsidiary shrine each, on the north and south. The sanctum-sanctorum measuring internally 4.85 X 3.20 m with 1.25 m thick walls housed a monolithic 1.45 m tall, granite Buddha, sitting in *padmasana* pose and in *bhumisprasa-mudra,* on a high stone pedestal with lion figures carved on either side.

Initially, the roof of the *garbhagriha* was supported by four exquisitely carved monolithic

Plates 88-89



88



89

Sirpur: 88, *Buddhist temple-cum-nunnery, view from south-west and* 89, *Siva temple, view from north*

pillars to which two more pillars were added, in course of time when the brick-paved floor was raised twice. The last floor was plastered with lime and painted with red ochre solution. All the three shrines were provided with stone *pranalika* towards the west.

The most important antiquity recovered from inside the sanctum-sanctorum is a huge hanging bell of iron, 32 cm in length and 30 cm in diameter.

Attached with the temple on the western side is a huge Nunnery comprising a sixteen-pillared 10 X 8 m *mandapa* surrounded by a row of 2.00 X 2.40 m rooms on north, west and south. So far, twelve rooms, opening in a 2.10 m wide verandah were exposed. One of the rooms on the western side has an attached ante-room of a smaller size. The entrance to the Vihara was from the west. The nunnery was enclosed by a 2.5 m thick stone enclosure measuring 250 X 210 m and having sixteen bastions measuring alternately 13 m and 30 m in diameter.

A large number of iron objects, like nails, dowels, door-jambs etc., along with thin red-slipped ware from lower levels and coarse black and grey ware from upper levels were recovered. Almost each room yielded fragments of coloured, decorated glass bangles, pointing to the face that the Vihara was a nunnery. A number of badly damaged sculptures were also recovered. Mason's marks in the from of alphabets in Brahmi datable to the fifth century AD, were noticed on the top slabs of the plinth. From the top levels two alloy coins belonging to the Khalji king Sultan Alau'd Din (AD 1308-09) were recovered. On the obverse it reads Sultan-ul-Azam 'Alaud Dunya Wad-Din whereas on the reverse it reads Muhammad Shah in the inner circle while in the outer in Brahmi-Shri Sultan Alawadin, 708.

To the south-east, just outside the enclosed area is located SRP-2-2000. The northern portion of the mound was excavated which revealed a west facing Siva temple. The temple, *pancha-ratha* on plan, externally measuring 12.20 X 7.20 m, consists of a sanctum, 3.25 X 3.25 m internally, a narrow *antarala,* 3.50 X 1.60, a 1.05 m wide *mukha-mandapa,* preceded by a 5.75 X 2.00 m (internally) *mandapa* (pl. 89).

Like the Vihara-complex, here also upto the plinth level, construction is of slate slabs whereas the upper structure was of bricks measuring 40 X 20 X 7 cm. While the mason's marks in the form of alphabets are found in the slabs of Vihara, such marks are conspicuous by their absence in Siva temple where only engraved linear marks are available.

The center of the sanctum-sanctorum is occupied by another square, slightly depressed area, measuring 1.80 x 1.80 m. In the center of this square is found *yonipitha* in slatestone having diameter of 1.80, with a polished *linga* in black granite in the center (1.20 m high). The girth of *linga* is 1.10 m. From inside the sanctum-sanctorum another *yonipitha* having *singha-mukha pranala* along with smaller *linga,* was recovered. In the northern side of the *garbhagriha* there is a covered drain made of dressed-laterite blocks having schist slabs over it, discharging in the tank inside the enclosed area.

Antiquities recovered from the temple include a beautiful Nataraja figure in high relief with the stone-slab frame, a Mahishasuramardini plaque, head of Siva, beads, iron implements such

as dowels, spear-heads, arrow-heads, nails, terracotta bull figurines, bangles etc. Pottery recovered include thin slipped-red ware, dull thick red ware and coarse grey and black ware.

There are two important features noticed in both the complexes, marked by evidence of an earthquake with its epicentre towards the west. Huge lateritic blocks and stone-slabs have developed vertical cracks, 5 to 10 cm in width, running west-east. The super structure and image of Buddha have tilted towards east perhaps as a result of some tectonic movement which occurred after fifth century and prior to the eight century AD. All the walls running north-south were built with an inclination of 23° deviating from the magnetic north as north-east corner *Ishana* is supposed to be the most sacred direction for placement of deities. Incidentally Mahanadi which flows from south-west to north-east, has its central stream deviated by 23° E.

From below the foundation level of the Vihara, two Late Acheulian stone tools were recovered. Both the tools are made on quartizitic sandstone. One is a broken cleaver made on a flake with 8 cm working edge while the other is a highly rolled and heavily encrusted 14 cm long handaxe. The recovery of these tools, for the first time, at Sirpur, takes back the antiquity to prehistoric times.

42. EXCAVATION AT SANCHI, DISTRICT RAISEN

In continuation of the previous year's work *{1997-98,* pp. 103-105), excavation was resumed at Sanchi, under the direction of P.K. Mishra, assisted by Narayan Vyas, N. Taher, Shambhunath Rajbhar, Manuel Joseph and C.K. Bhanarkar, for tracing the extension of previously excavated structures as well as their inter relationship with the existing monuments namely: Monastery 37 and Temple 40. The excavation carried out in-between these structures revealed the remains of three periods.

Period I is marked by the structural remains, built directly on bed-rock. The remains include: part of the monastery-complex, stone-paved pathway and brick-paved drain. The size of the brick is 32 X 17 X 7 cm - the same as in Mauryan Monastery No. 51. The prominent type of pottery found here are black-slipped ware, red-slipped ware, black-and-red ware, red ware and black on red ware. Among the antiquities, terracotta bead, miniature stupa, skin rubber, sling ball are the most important finds.

In Period II which is marked by two rooms with flag-stone flooring, a large number of pits were dug. The contemporary layers were also marked by the conspicuous increase in micaceous red ware. The antiquities include: miniature stupa, varius types of nails, spear-head and shell bangles.

Period III is marked by the remains of a four-roomed structure constructed by using dressed-stones. The significant deviation in pottery is the appearance of stamped variety. Among the antiquities a terracotta sealing with the Buddhist creed inscribed in Gupta Brahmi, miniature stupa, various types of iron nails and terracotta beads besides a stray Mahishasuramardini plaque are among the important finds.

43. EXCAVATION AT SATDHARA, DISTRICT RAISEN

In continuation of the previous year's work *{1997-1998,* p. 105), P.K. Mishra, assisted by Narayan Vyas, N. Taher, Shambhunath Rajbhar, Manuel Joseph, Nitin Shrivastava and C.K. Bhanarkar and Ramesh Thakur, resumed excava-

tion primarily in the northwestern corner of the large square platform at the location of the Great Stupa with a view to ascertaining the time of construction of the platform in addition to the working level of various phases.

The excavation revealed the platform, built on natural surface. The random rubble filling of the platform contained occasional potsheds of red ware, dull red ware and grey ware *of circa* third second century. Occasional patches of lime deposited by action of water on the boulders indicated the use of lime as mortar and plaster on the Great Stupa. Excavation near the *medhi* of the stupa revealed the last working level of the site. Amongst the antiquities recovered, an iron nail, clamp and two stone weights are noteworthy.

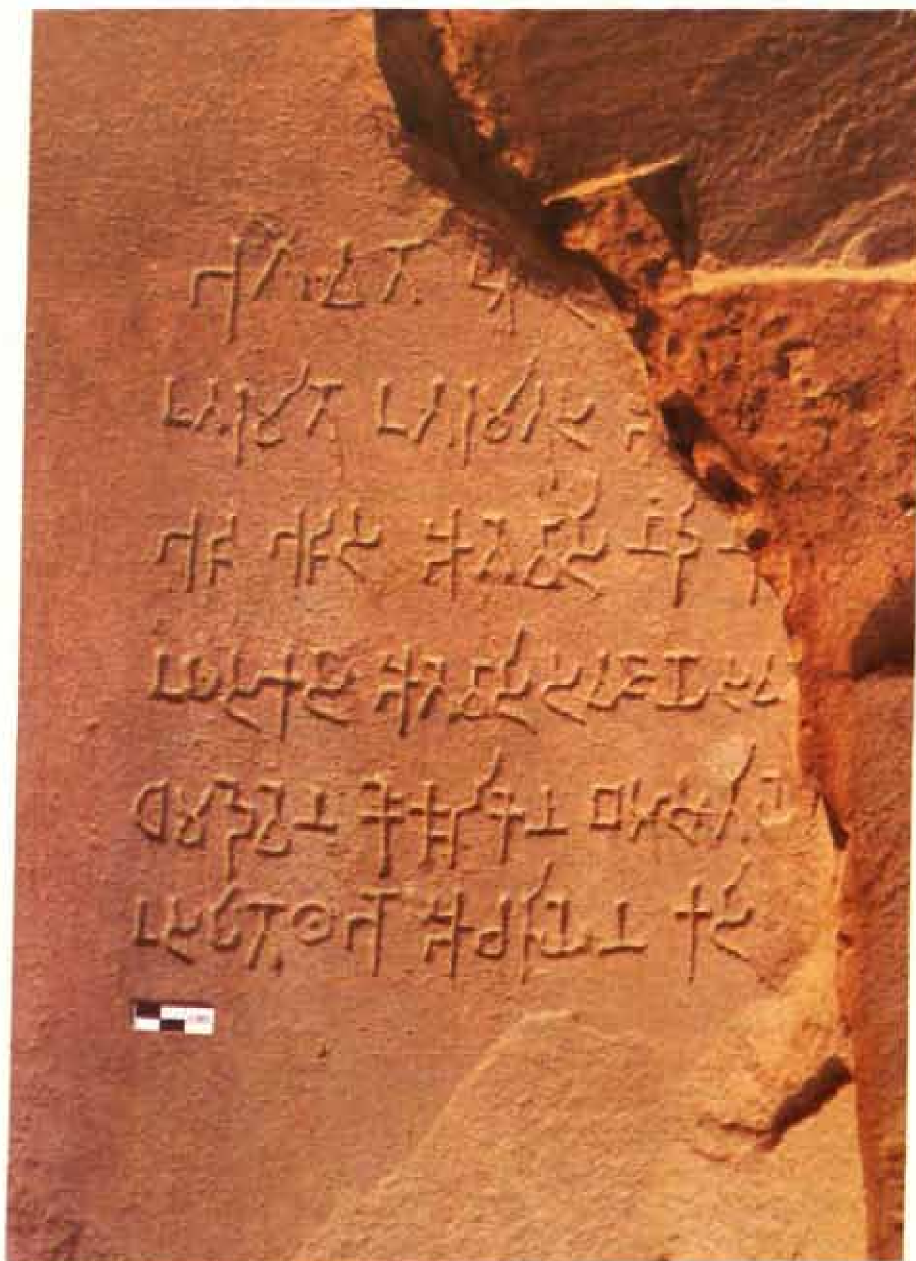
44. EXCAVATION AT DEOR KOTHAR, DISTRICT REWA

P.K. Mishra, assisted by Narayan Vyas, N. Taher, O.D. Shukla, Manuel Joseph, Shambhunath Rajbhar, R.K. Shrivastava, O.B. Khobragade, N.S. Pawar, C.K. Bhanarkar, S.S. Bisht, Awadesh Sinha and Santosh Saxena, of the Bhopal Circle, of the Survey, conducted excavation around Stupa 1 and 2, with the view to exposing the sequence of events on the basis of structural and stratigraphical remains besides ascertaining the extant structures and disjointed architectural members for the purpose of future conservation. Both the stupas were covered by a blanket of brickbats above the *medhi* level and tapering away from them. Excavation was conducted along the cardinal directions of Stupa 1 with a view to exposing the gateways there. In the northern quadrant, the removal of layer filled with brickbats revealed underlying broken pieces of balustrade which encompassed the brick stupa. Five fragmentary donative inscriptions, dated to early second century BC were found in this sector. The quadrant in the eastern part of the stupa again had broken fragments of *stambha, suchi and ushnisha, in-situ* stumps of *stambha* in a row and flag-stone flooring beneath the brick debris. *Ushnisha,* belonging to the *harmika* overlying the layer filled with brickbat, in the southern segment surrounding *medhi* of stupa, a concentric rind of one brick thickness was found. This circular wall is separated from the main structure by an intervening groove, filled with mud mortar. The bricks of this ring average 47 X 25 X 7 cm. The variance from the mean is about 1 cm in both length and breadth. The size of brick noted on the top of *anda* of the Stupa 1 however, is 49 X 29 X 7 cm. Like other quadrants in the north and east on removal of layer filled with brickbat, broken architectural members were observed lying scattered on the floor.

Excavation in western part, adjacent to the stupa revealed L shaped entrance represented by the stumps *of stambha.* The floor here containing disjointed patches of flag-stone flooring is overlain by fragmented pieces of the ground balustrade. Twenty pieces of a huge pillar reminiscent of Asokan type were found here. These included the over turned pieces of the pillar base. Most important find is a piece containing six lined inscription in Mauryan/early second century BC Brahmi (pi. 90). A fragmentary abacus shows part of a bull, another unidentified animal and a standing human figure. Two Brahmi inscriptions on balustrade members were the other finds observed here.

The Stupa 2 situated about 300 meters south-south-west of the former was excavated. The *anda* of this stupa is having a core consisting of square brick 30 X 30 X8 cm. It is encircled by a concentric wall of a single course with brick sizes measuring 36 X 30 X 8 cm. The gap of about 10 cm between the core and the circular wall is filled with mud mortar. The *anda* is encircled by a *medhi.* From the extant remains the filing of brickbats contained by a wall of wedge-shaped brick (40 X 34 X 49 X 8 cm). Among the antiquities the con

Plate 90



Deor Kothar: inscribed pillar

spicuous ones are four patinated coins, one of them apparently bearing a frontal depiction of elephant. Apart from coins a few stone beads were also recovered.

MAHARASHTRA

45. EXCAVATION AT AJANTA CAVES, DISTRICT At AURANGABAD

In order to trace the structural remains as also to co-relate the rock-cut cave for ascertaining the habitational activity of the Satavahana-Vakataka period, S.V. Venkateshaiah, of the Aurangabad Circle, of the Survey, assisted by M. Mahadevaiah, R. Krishnaiah, J. V. Rao, M. Kasturi Bai, V.D. Jadhav, Hemsagar Naik, H.R. Desai, D.L. Sirdeshapande and V.R. Satbhai, carried out scientific debris clearance work on the right bank of River Waghora, opposite of Cave 4.

On the basis of evidence found in section and surface, the area on the right bank of the River Waghora overlooking Caves 4 and 17 was selected and six trenches measuring 10 X 10 m in north-south direction were laid. Each trench sub-divided into four quadrants, measuring 5 X 5 m each including baulk. In Trench A1, a brick platform was found at a depth of 30 cm below surface. Right over the platform a heap of fallen bricks in roughly concentric circles, were encountered. A close examination of this structure revealed some sort of dome-like circular brick activity, possibly indicating a votive stupa.

Two parallel thick brick walls were found in east-west direction to a length of 14.72 m with 2.60 m apart and connected by 0.48 m transverse walls and forming a row of five cells. The width of the back wall measures 0.88 m while the front wall measuring 0.78 m and the entrances for cells are situated on the north. Of these cells, the central cell is larger in size measuring 3.25 X 2.60 m flanked by two cells on either side having dimension of 2.60 X 2.60 m each. The central cell was a shrine with a brick pedestal laid abutting the back wall having a square slot cut into it, perhaps meant for installation of an idol. Later on this pedestal was enlarged into a raised rectangular brick-platform extending to the foil width of the cell encasing the earlier idol and the pedestal. This platform is 3.52 m long and 1.24 m wide with simple *adhishthana* moulding (phase II). The floor level was also raised correspondingly. The rammed-floors are laid with river pebble packing. The entrances are 73-74 cm width and had doorsills cut into the brick perhaps to accommodate wooden doors. The cells had evidently two phases of activity as shown by the raised floor levels. The sizes of bricks measure 48 X 23 X 8 cm and 45 X 22 X 7 cm which are almost the same as found in the excavation at Bhokardan.

46. EXPLORATION IN DISTRICT AURANGABAD

The exploration was undertaken on the opposite side of the caves of Ajanta at the foot hills on the right bank of River Waghora under the direction of S.V. Venkateshaiah, assisted by M. Mahadevaiah, V.D. Jadhav, H.S. Naik and H.R. Desai, of the Aurangabad Circle, of the Survey, to study the ancient remains noticed on the cliff section of the foot hill.

The exploration revealed the remains of brick retaining wall (43 X 21 X 8 cm and 40 X 20 X 8 cm) along the periphery of the hillock where runs the ancient pathway. During the course of exploration, some potsherds and antiquities were collected in the form of sprinklers of typical Kushan variety, bowls and vases of red polished ware, coarse red ware and a brick (cube).

47. EXPLORATION IN DISTRICT CHANDRAPUR

During the course of village-to-village survey, M.R. Dhekane, of the Aurangabad Circle, of the Survey, noticed the following cultural remains.

Village	*Taluk*	*Nature of remains*
Bhadravati	Bhadravati	Temple remains of Brahmanical and Jaina pantheons and loose sculptures of medieval period
Bhandak	-do-	Temple remains and loose sculptures of Brahmanical pantheon of medieval period
Chandankheda	-do-	Loose sculpture of Ganesa, Vishnu, Haragauri, Mahishasuramardini, etc., of medieval period
Dhanora-Pimpari	-do-	Temple remains of Siva temple of medieval period
Ghot-Nimbala	-do-	Temple remains of Brahmanical pantheon and loose sculptures of Ganesa, Gauri, Siva, Brahma, Vishnu, etc., of medieval period
Manora	-do-	Remains of Siva temple belonging to the medieval period
Vada	Chandrapur	Temples dedicated to Vishnu and Balaji of seventeenth century
Judga	Wani	Temple remains of medieval period
Mangoli	-do-	Temple remains of eighteenth century
Vanoja	-do-	Temple remains of Vemoja devi of late medieval period
Chikni	Warora	Temple remains of seventeenth century
Kharwad	-do-	Siva temple of Hemadpanthi style twelfth-thirteenth century
Waghnaka	-do-	Siva temple of Hemadpanthi style, twelfth-thirteenth century

48. EXCAVATION AT MANSAR, DISTRICT NAGPUR

In continuation of the earlier work *(1998-99,* pp. 114-117), excavation was carried out by the Bodhisattva Nagarjuna Smarak Sanstha Va Anusandhan Kendra, Nagpur, under the direction of Jagat Pati Joshi and A.K. Sharma, assisted by Reema Sobti, Dhirendra Sharma, J.S. Dubey and Balbir Singh in MNS-3 area.

Further digging was carried out at a depth of 3.10 m, to the west of the uppermost stupa which revealed the dressed-stone foundation of the *mandapa* and *garbhagriha* of the earliest temple, facing east which was partly exposed in 1997-98. It has a rectangular brick platform in the western wall of the *garbhagriha.* The side entrance in the north is 0.90 m in width and comprises five courses of dressed rough grained whitish sandstone with two steps. North-south width of the temple is 12.60 m. In order to strengthen the northern and southern slopes of the hillock, massive pitching walls were raised to an extent of 60 m, on each side using huge boulders.

By the side of huge natural granitic outcrop was dug a cave on the southern side with its side walls lined with bricks, at a depth of 1.5 m. This has corbelled-arch to cover the top. Steps were also laid in bricks on the western side of the cave.

To the west of this cave, two square *hawan kundas,* with brick linings were exposed in front of the Siva shrines. The larger *hawan kunda* contains two rows of brick linings, outer 3.0 X 3.00 m while the inner one 1.35 X 1.35 m, the outer lining have two *pranalikas* on each side having a width of 0.20 m. Thickness of the lining walls is 0.85 m.

To the north-east of the upper most stupa and to the north of' the *purushamedha,* at a higher level, abutting the northern wall of the boxes of the earlier stupa, a stone stupa built of semi-dressed stones was exposed. It has a diameter of 13.0 m and is enclosed by a 1.10 m wide *pradakshina-patha* of bricks measuring 42 X 22 X 7 cm in size. The inner side of the stupa was strengthened by providing two stone walls, running in east-west direction. On the eastern side, stupa height is available to a height of 2.10 m with six courses of semi-dressed stones.

To the east of the grand steps and amphitheater, on a levelled surface, a Vihara made of bricks was exposed upto twelve courses. It comprises atleast nine rooms measuring 2.20 X 2.20 m each, on the north, south and east, made by partitioning an earlier 12.50 X 12.50 m hall. In-between the two rows of rooms a 8.00 m long east-west and 2.30 m wide, north-south, open space leads to a 7.00 m long east-west, and 2.10 m wide, north-south, prayer hall, Bricks, used in the construction of this Vihara are 30 X 22 X 7 cm in size.

While exposing the boulder foundation of the uppermost stupa, from the southeastern corner, at a depth of 1.10 m below surface, fragment of an earthern relic casket along with two fragments of charred human bones were recovered. The relic casket of micaceous clay bears an additional coating of mica on the outer surface.

Further on the western side, on the foot of the Siva shrines, a huge hall measuring 9.60 X 9.60 m with attached verandah, 8.0 X 1.60 m and a corridor on the southern side leading to the main entrance of the cave shrines, was exposed. While constructing these structures of bricks, the huge granitic outcrop on the northeastern side was not disturbed. The southern and eastern walls comprised two projections and were decorated with mouldings in the entire length.

The entrance to the *syenachiti* and *kurmachiti,* which was hidden in the baulk was exposed. It is 2.90 m in width with three flights of steps. The lower two lying in the center are 0.80 m in width. The entrance has two side arms. While exposing the entrance, was noticed a brick wall, raised at a later date that had collapsed all at a time caused as a result of tectonic movement occurred after the performance *of purushamedha yajna* and before the construction of the topmost stupa, i.e., sometime between the fourth and sixth century AD. All the bricks have fallen in brick-on-edge position with mortar in-between remaining intact. The eastern outer wall of the two *chitis* exposed, also display some triangular method of construction as was witnessed in constructing the inner side of the *chitis.*

Plates 91-92



91



92

91, *Mansar: Vakataka inscriptions and* 92, *Dwarabandha II: Lower Palaeolithic tools*

Apart from the structural remains, the most outstanding finds of this season's dig were the most beautifully carved red fine-grained sandstone figures comprising Saivite images, particularly belonging to Tantric cult. The well delineated sculptures of Siva-Parvati, Uma-Mahesvara, *ganas,* Lajjagauri and structural fragments are noteworthy for superb craftsmanship of Vakataka artists. A good number of inscriptions on structural fragments in typical eastern Vakataka box-headed Brahmi characters were recovered. An earlier inscription datable to second century BC was also recovered (pl. 91). The inscriptions are mostly prayer hymns in Sanskrit. A number of iron objects including dowels, nails, door-jambs etc., glass pendants, beads and other terracotta objects were also recovered. The structures exposed during the last two seasons were duly conserved using the recovered bricks from the site.

49. EXPLORATION IN DISTRICT NANDED

During the course of exploration, V.D. Jadhav and H.R. Desai, of the Aurangabad Circle, of the Survey, noticed medieval temple remains and loose sculptures of Brahmanical pantheon.

50. EXPLORATION IN DISTRICT RAIGAD

Under the direction of S.V. Venkateshaiah, assisted by M. Mahadevaiah, V.D. Jadhav and H.S. Naik, of the Aurangabad Circle, of the Survey, carried out exploration on the island of Elephanta.

A stone boulder enclosure was noticed around the brick stupa, located on the top of the eastern hill, along with an entrance with a flight of steps at the southern side. To the northern side of the same hill, a brick structure was also noticed in the section on the right bank of the *nala.* The brick size is almost the same as that of the Vakataka period. A few moulded bricks were also collected from the same area. Further down in the same section, plenty of potsherds were found embedded.

51. EXPLORATION IN MIDDLE BRAHMANI VALLEY, DISTRICT ANGUL

The problem oriented exploration was carried out by the Bhubaneswar Circle, of the Survey, under the direction of L. S. Rao, assisted by J. K. Pattanaik, A. K. Tiwari and Z. Ali in Angul District of central Orissa. A stretch of approximately 50 km on both the banks of the River Brahmani, from Rengali to Samal was systematically surveyed. A total number of fifty-eight localities and villages were subjected to investigation during the exploration.



ORISSA

The undivided Dhenkanal district (between 20° 29' N to 21° 42' N and 84° 16' E to 86° 2; E) in central Orissa is bordered with two major river systems like Brahmani and Mahanadi and confluence of coastal region in the east and the hilly tract on the west. It is bounded by districts like Jajpur in the east, Keonjhar in the north, Deogarh in the north-west, Sambalpur in the west and Nayagarh, Baudh in south. River Mahanadi is the dividing line between Districts Angul and Baudh, flowing in the south-east direction.

In the course of exploration the following sites were located.

Village/Site	***Geomorphology***	***Nature of remains***
Andherikhola (ANK) (85° 13'E; 21° 04'N)	Left bank of the river at a distance of 3 km. Situated on the southern slope of the Baruan hillrange. Dense mixed jungle and shrubs	Lower Palaeolithic and neolithic comprising unifacial tools muller, chisel and ringstone
Ankila (ARK) (85° 08'E; 21° 12'N)	1 km away from Brhamani river on the left bank. The locality is having alluvium deposit surrounded by small hillocks on north, north-east and south-east direction	Lower Palaeolithic unifacial tools, handaxe, cleaver and scrapers
Bajrakot (BJK) (85° 03'E; 21° 10'N)	Right bank of river Brahmani	Historical ruins of Saiva temple consisting of architectural fragments like door frames, *Siva-linga, amalaka* parts, foundation and other sculptural fragments. The remains are datable to *circa* eighth-ninth century
Balangi (BLG) (85° 06'E; 21° 04'N)	Right bank of river Brahmani and on the right bank of Singhodajor, a tributary of Brahmani. Situated in the north-western slope of the Kanhei jena hill. Locality is fully dense forest	Mesolithic waterborne fluted cores in gravel deposit, neolithic chisel and adze cemented gravel deposit
Balaramapur (BRP) (85° 03'E; 21° 05'N)	Right bank of Tikara river, a tributary of Brahmani at a distance of 1.5 km. Presently, the locality is nearby water reservoir constructed by NTPC. Outcrops are laterite, red soil quartzite, mixed dense forest	Lower Palaeolithic cleaver, handaxe, scraper, bifacial core tools
Banasingha (BNS) (85° 04'E; 21° 07'N)	Left bank of Tikara river at a distance of 0.5 km. Situated on the foothill of small hillock. Locality is surrounded by small hills on three sides. Mixed dense forest, shrubs. Outcrops are laterite, calcarius nodules, red soil, quartzite and sandstone, etc.	Neolithic macehead, barcelt, chisel

Village/Site	*Geomorphology*	*Nature of remains*
Baudaberhu (BDB) (85°04'E;21°1l'N)	Right bank of River Brahmani at a distance of 2 km. Situated on the western slope of Dhenkuli hill, mixed jungle. Outcrops are laterite, quartzite-quartz and sandstone etc.	Neolithic chisels
Beherabhuin (85° 09'E; 21° 12'N)	Left bank of River Brahmani at a distance of 1.5 km. It is on the confluence of Jambua Nala and Andheri Nala. It is also on the south-east slope of the Khajuria hill. Mixed dense forest, shrubs. Outcrops are granite, sandstone, red *murrum,* laterite, etc.	Mesolithic elongated blades, fluted cores, neolithic chisels
Besalia (BSL)	Left bank of River Brahmani at a distance of 5 km. It is in-between small hills of Jambua and Banduli. Dense mixed jungle, Outcrop are quartzite, granite and sandstone laterite, etc.	Neolithic adze, chisel
Bhaliabcrha (BLB) (85° 04'E; 21° 14'N)	Left bank of River Brahmini at about 1 km distance, situated on the southern slope of Kendugotha hill. Fairly mixed dense jungle mainly of *sal.* Outcrops are laterite, red soil, quartzite, etc.	Lower Palaeolithic handaxe, unifacial scraper, neolithic macehead, chisel, iron smelting activities
Bilinda (BLD) (85° 09' E; 21° 04' N)	On the right bank of River Brahmani, situated at a distance of 1 km on the northeastern slope of Kanheijena hill. Gravel deposit of pebbles showing west and dry phases. Mixed dense jungle, red soil, quartzite, quartz, etc.	Lower Palaeolithic handaxes and scraper
Dangarabera (DBH) (85° 09'E; 21° 05'N)	On the left bank of River Brahmani at a distance of 1 km in the southern slope of Baruan hill range. Fairly mixed jungle with *sal* trees. Outcrop are quartz, quartzite and occasional laterite and red soil	Lower Palaeolithic handaxe, neolithic macehead and chisel



93



94

Dwarbandha II: 93, Lower Palaeolithic tools and 94, Neolithic tools

Village/Site	*Geomorphology*	*Nature of remains*
Dhiramunda (DMD)	Right bank of River Brahmani about 2 km away from Rengali dam site, on the foot hill of hill range. Outcrops are quartzite, quartz, sandstone	Lower Palaeolithic handaxe and scraper
Dwarabandha (DWB-1) (85°06'E; 21°14'N)	On the right bank of River Brahmani at a distance of 2 km. It is on the south-eastern slope of the Kendugotha and Machhkhani hills. The locality is dense mixed jungle. Outcrops are laterite and quartzite	Lower, Palaeolithic cleaver, handaxe, unifacial and scraper
Dwarabandha (DWB-2) (85° 06'E; 21° 13'N)	On the right bank of River Brahmani at a distance of 2 km. It is on the south-eastern slope of the Kendugotha and Machhkhani hills. The locality is dense mixed jungle. Outcrops are laterite and quartzite	Lower Palaeolithic cleaver, neolithic chisel and macehead (pls. 92-95)
Ekagharia (EGR) (85° 09'E; 21° 03'N)	On the right bank of River Brahmani, situated in the eastern foot hills of Kanheijena hill. Dense mixed forest. Alluvium mixed with gravel deposit. Outcrops are laterite sandstone, quartz and quartzite	Lower Palaeolithic handaxe, neolithic chisel and macehead
Gengutia-1 (GTA-1) (85° 04'E; 21° 15'N)	Left bank of River Brahmani at a distance of 2.5 km between southern slope of Machhkhani hill and western slope of Kendugotha hill. Fairly dense mixed jungle. Outcrops are laterite, quartz, quartzite, sandstone and haematitie nodules	Lower Palaeolithic bifacial and unifacial cleaver, scraper, handaxe, mesolithic tools, neolithic macehead (pl. 96), ancient early historical mound containing burnt brickbats and iron smelting activities
Gengutia-2 (GTA-2) (85° 04'E; 21° 15'N)	Left bank of River Brahmani at a distance of 2.5 km between southern slope of Machhkhani hill and western slope of Kendugotha hill. Fairly dense mixed jungle. Outcrops are laterite, quartz, quartzite, sandstone and haematic nodules	Mesolithic blades, neolithic chisel and adzes

Plates 95-96



95



96

95, *Dwarabandha II: Neolithic tools and* 96, *Gengutia I: Neolithic tools*

		Nature of remains
Golabandha (GLB) (84° 53'E; 21° 51'N)	Site is located 4 km south of Jimnia hill, mixed shrubs and jungles. Outcrop is lateritic shelf. Nearest stream is about 3 km, called Pandiani- a tributary of Brahmani	Lower Palaeolithic handaxe, scraper, neolithic barcelt, macehead and chisel
Hanumanapur (HNP) (85°04'E;21°08'N)	Right bank of Brahmani at a distance of 4.5 km. It is on the valley amidst the Burhapahar (w), Kiajhar Pahara (S) and Dhenkuli Pahar (N). Mixed dense jungle. Outcrops are laterite shelf, quartzite, quartz, sandstone, etc.	Lower Palaeolithic unifacial tools, mesolithic tools and neolithic chisel
Jadunathapur (JNP) (85°07'E;21°02'N)	It is in-between right bank of Brahmani (4 km) and Shingodajor (a tributary of Brahmani). It is also located in the valley between Kanhei Jena hill (N) and Rocky knobs of small hillocks (S). Open mixed forest. Outcrops are chiefly laterite, quartzite and sandstone	Lower Palaeolithic bifacial tools (pebble tools industry), mesolithic tools and neolithic chisel
Jambua (JMB) (85° 08'E; 21° 14'N)	Left bank of Brahmani at a distance of 6 km. Outcrops are quartzite and sandstone	Lower Palaeolithic handaxe
23. Kantola (KTL) (85° 03'E; 21° 13'N)	On the left bank of River Brahmani at a distance of 2 km and on the southern slope of Khajuria hill. Mixed dense forest. Outcrops are sandstone, quartizite, quartz and laterite	Lower Palaeolithic handaxe, unifacial and bifacial tools, scraper, middle Palaeolithic flake tool, tortoise core and borer
Karadakhamana (KKM) (85° 07'E; 21° 13'N)	On the left bank of River Brahmani at a distance of 4 km. The site is located between the foothills of Khajuria hill in north-west and Burhia in the west. Mixed dense forest. Outcrops are sandstone, quartzite and quartz	Lower Palaeolithic
Karnapala (KPL) (85°09'E;21°H'N)	Left bank of Brahmani on the confluence of Andherijor. Area is rich in alluvium deposit	Lower Palaeolithic handaxe

Plates 97-98



97



98

Shrirampur: 97-98, blades and micro-blades

Village/Site	Geomorphology	Nature of remains
Khalapala (KHP) (85° 09'E; 21° 11'N)	On the right bank Brahmani on a small stream to Brahmani (Chilantijor). The main river is about 2.5 km. Outcrops are granite and quartzite, etc.	Microliths
Nalama (NLM) (85°07'E;21°H'N)	On the northern slope of some isolated hillocks, containing quartz, quartzite and other semiprecious stones in veins. River is about 1 km away from the site	Microliths, fluted cores, neolithic macehead and chisel
Patakhamana (PKM) (85° 03'E; 21° 06'N)	On the left bank of River Tikara, which is a tributary of Brahmani, mixed dense forest mainly of Sal	Lower Palaeolithic handaxe, neolithic macehead
Patuapali (PPL) (85° 12'E; 21° 04'N)	On the left bank of River Brahmani to the southern slope of Baruan hill. Quartzite, sandstone and limestone are available as outcrops .	Lower Palaeolithic unifacial tools, cleaver, scraper, neolithic chisel
Poipala (PPA) (85° 08'E; 21° 09'N)	On the right bank of River Brahmani, tools have weathered quartzite *murrum,* mixed dense forest	Neolithic macehead, chisel and adze
Poragarh (PGH) (85° 03'E; 21° 09'N)	On the left bank of River Brahmani to the southern slope of Machhakhani hill. Quartzite and sandstone are available in the area as chief raw material	Lower Palaeolithic handaxe, unifacial tools
Purunapani (PPN) (85° 09'E; 21° 13'N)	On the left bank of River Brahmani which is about 5 km from the site	Lower Palaeolithic scraper, core tool, neolithic macehead
Radharamanapur (RRP)	Right bank of Brahmani, mixed dense forested area. Ourcrops are quartz and quartzite	Lower Palaeolithic handaxe and microliths
Ramachandrapur (RCP) (85° 10'E; 21° 10'N)	On the left bank of River Brahmani, about 2 km from the site. Outcrops are laterite shelf and sandstone	Iron smelting activities
Shriramapur (SRP) (85° 08' E; 21° 02' N)	On the right bank of River Brahmani about 6 km distance. Laterite, sandstone, quartz stones are available in the small hillocks around. Mixed dense forest	Lower Palaeolithic handaxe, unifacial tools, microliths, core tools (pl. 97-98), neolithic macehead, chisel, stone bangle (pl. 99), iron smelting activities

Plates 99-100



99



100

99, Shrirampur: Neolithic tools and 100, Siling: Mesolithic tools

Village/Site	Geomorphology	Nature of remains
Siling (SLG) (85° 09'E; 21° 08'N)	On the left bank of River Brahmani where Brahmani becomes narrower because of hills on both banks, Quartzite stone bed-rock was used as floor level by the early man	Middle Palaeolithic scraper, flake tools (pi. 100); microliths; neolithic shouldered celt. chisel; iron age settlement
Talapada (TPD) (85° 09'E; 21° 08'N)	On the right bank of River Brahmani, opposite Siling. The river becomes narrower because of the hills on both banks	Microliths, neolithic barcelt, chisel and macehead
Tumugula (TMG) (85°10'E;21°04'N)	On the left bank of River Brahmani to the southern slope of Baruan hill containing quartzite and limestone rocks, mixed dense forest	Lower Palaeolithic handaxe, unifacial and bifacial tools, scraper and neolithic barcelt and chisel

52. EXPLORATION IN DISTRICT CUTTACK

In continuation of the earlier work, exploration along the right bank of River Mahanadi, in Banki tehsil, reconnaissance survey work was carried out by P.K. Dikhit, G.L. Katade, S.K. Dey. S.K. Khuntia, B.B. Badamah and R.N. Sahoo of the Excavation Branch-IV. Bhubaneswar, of the Survey, under the direction of Bimal Bandyopadhyay and A.K. Patel. The following archaeological remains were brought to light.

Village	Site	Nature of remains
Anuari	Anuari dhipa (20° 20' 16"N;85°26'23"E)	Partly disturbed mound with grinding stones, red ware and grey ware sherds of medieval period
Arapur	Sikuliapadia (20° 20' 48"N; 85° 35' 50"E)	Mound with grey and red ware of medieval period
Baideswara	Kainphul Baba Ashram (20° 21' 21 "N; 85° 24' 23"E)	Mound with grey and red ware of medieval period
Banahara	Bautikuda (20°I9'37"N;85°35'15"E)	Mound with grey and red ware of medieval period
Dulanpur	Jenadhipa (20°22'17"N;85°36'15"E)	Disturbed mound with grey and red ware of medieval period
Dulanapur	Keladiha (20°22'09"N;85°35'41"E)	Mound with grey and red wares of medieval period

Village	*Site*	*Nature of remains*
Durgapur	Banki Gada (20°2r29"N;85°30'33"E)	Late medieval fort site with grey and red wares
Gobindpur	Barabati Tota (20°22'34"N;85°37'21"E)	Mound with grey and red wares of medieval period
Gopa-Batalama	Chandipadia (20°21'20"N;85°27'04"E)	Disturbed mound with grey and red wares of medieval period
Padanpur	Kurmumikuda (20°18'47"N;85°35' 12"E)	Ruined temple and mutilated sculptures of medieval period
Padanpur	Matiasahidhipa (20°19'03"N;85°34'02"E)	Disturbed mound with grey and dull red wares
Ramachandrapur	Bhedadiha (20°21'45"N;85°28'03"E)	Disturbed mound with grey and red wares of medieval period
Santarapur	Dahanigadia (20°18'22"N;85°34'02"E)	Mound with grey and red wares of medieval period
Talbasta	Asulidhipa (20°19'35"N;85°34'43"E)	Disturbed mound with grey and dull red wares of medieval period

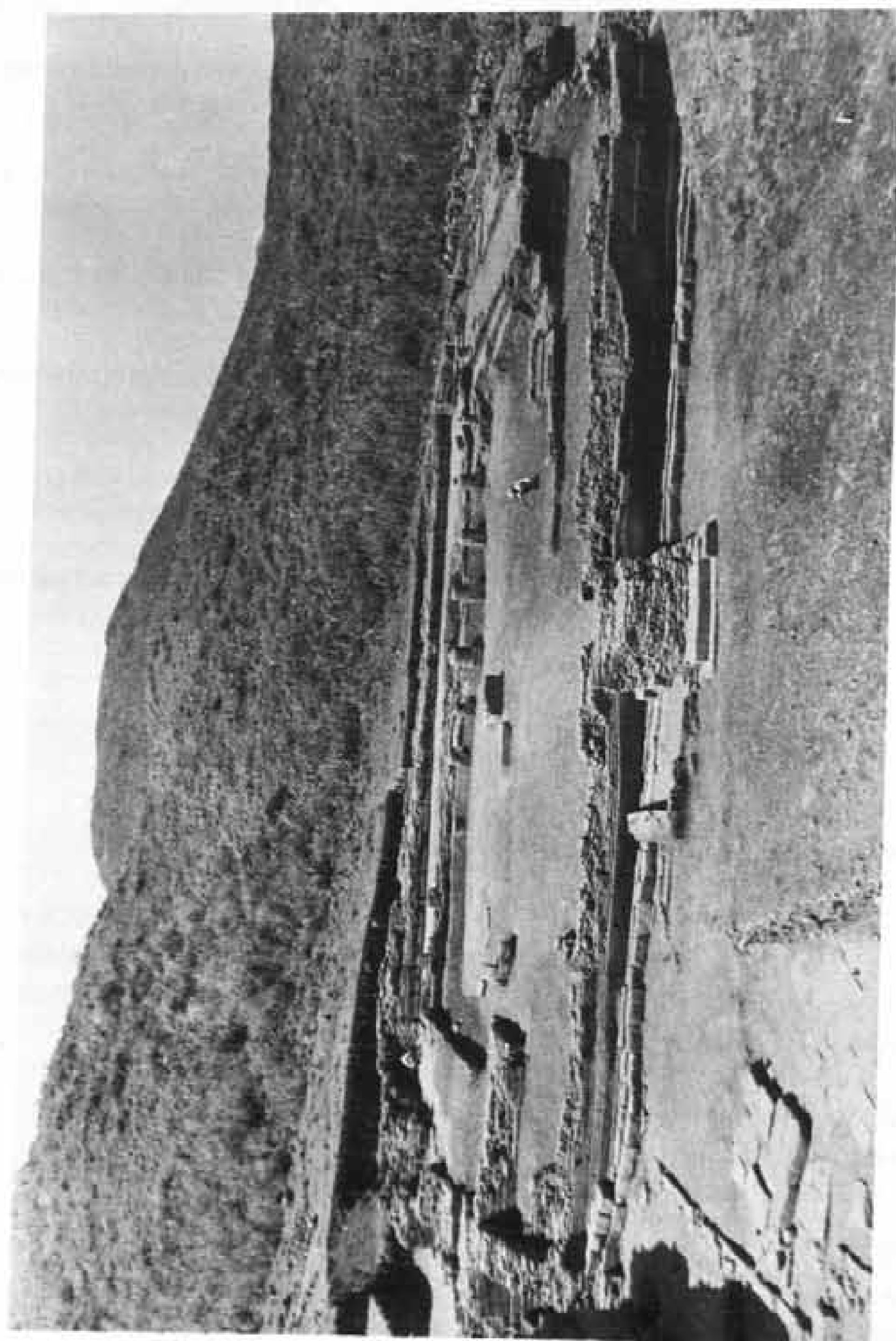
53. Excavation at Udaygiki-2, District Jajpur

In continuation of the previous year's work (79P5-PP,pp.l20-130), the Excavation Branch-IV, Bhubaneswar, of the Survey, undertook excavation at Udaygiri - 2, under the direction of Bimal Bandyopadhyay, assisted by A.K. Patel, P.K. Dikhit, G.L. Katade, S.K. Dey, S.K. Khuntia, B.B. Badamali, R.N. Sahoo and S.K. Bhoi. The objectives of this year's excavation work were to expose the monastery on all the outer sides and to reveal plan of the structure on north-west of the monastery.

After clearing thick vegetation, twenty-one trenches numbering XB1, XB2, XC1, XC2, XD1, XD2, XE1, XE2, YB1, YB2, YC1, YD1, YD2, XB6, XB7, XC5, XC6, XC7, XD5, XD6 and XD7 were taken up for excavation. Out of these Trenches XC2, XB6, XC5 and XC6 were partly excavated during the last year. In addition to these trenches, some areas in the monastery were also taken up to check foundation of sanctum-sanctorum as also to trace the earlier structures below stone-paved courtyard.

A courtyard was formed in the central part of the monastery measuring 16 m X 16 m. It was paved with flag-stones, partly missing. In such areas where paved flag-stones were missing special operational areas were taken up to find out

Plate 101



101

Udaygiri-2: general view of shrine-complex

earlier structures. Flag-stones of the courtyard were placed over the rammed layer of debris measuring 40 to 60 cm., below it a brick paved courtyard measuring 8m x 8m was exposed. The kerb of this courtyard was also made of bricks and its width was lm. This brick-paved courtyard was occupying northeastern part of the stone-paved courtyard and it had its separate drain made up of dressed-stones right from the center of eastern kerb and was running outside towards east. It was noteworthy that the drain of stone-paved courtyard was running towards north.

The area in-between front wall of the sanctum and the courtyard was taken up for digging to check foundation of the sanctum. The area of the foundation of the sanctum was levelled to construct the sanctum and it was consolidated by providing rammed blackish *murram* with small boulders and stones of irregular size were placed, over which a brick wall was erected. The area was raised with rammed *murram,* layered by brick, upto the brick-wall.

In the course of clearance of debris from outer sides of the monastery an interesting structure was exposed in the form of a huge water reservoir situated in the south-west corner almost adjacent to the southern outer wall of monastery. The tank with brick built side wall had its floor on the rock surface. Its inner dimension was 6.70 m X 6.20 m while the depth was little more than 2 m. On the northern side a wide brick platform (8.00 X 5.80 m) was noticed. The wall of the tank was sloping partly for the use of shaped bricks. The tank was surely used for storing water.

After completing excavation of the monastery area and fully exposing it both from interior and outer sides, further work was taken up. This was done with a view to trace the link between the monastery and the area on the north-west of the mound where an assemblage of votive stupas was noticed.

The closed shrine-complex (32.00m X 21.00m) had its entrance towards east, access obtained through 3.04 m wide steps, lowest two steps in stone were lying intact (pl. 101). The upper steps were totally dilapidated with only brick core was visible. Inside area consisted of courtyard 21mxl3.6m with 2.8 m wide running passage verandah on three sides. Verandah was not provided to the east of the courtyard. At the center of the courtyard a massive image of Avalokitesvara (2.45 m X1.12 m) with twenty-five lined inscription on its back was found standing obliquely, supported by loose stones from back. The placement of this image in the courtyard was apparently a later addition. The courtyard, provided with flag-stones and votive stupas placed over them was noticed in the north-west corner of the courtyard. Floor of the verandah was still mostly intact due to the use of brick jelly and *lime-surkhi* combination mortar. The verandah was slightly raised from the courtyard and was veneered by bricks. Evidently stone pillars held the roof between the passage and the sanctum cells as well as carved niches. Five such square stone bases were noticed on the brick veneering of the verandah and two pillars with square base and circular shaft, tapering towards top were also recovered during the excavation. Top of these pillars had a knob probably for fixing wooden beams of the roof. The walls beyond the verandah had provision for holding images inside the carved niches. Besides this, in all probability to enshrine presiding deities, some shrine chambers were provided on the northern and the southern sides. Thus there were two

Plates 102-103



102



103

Udaygiri -2: 102, *projected shrine chambers in north-west corner of shrine-complex and* 103, *bust of Bodhisattva*

Plates 104-105



104



105

Udaygiri-2: 104, Bodhisattva head and 105, headless Buddhist male deity

Plates 106-107



106



107

Udaygiri-2: 106, *pedestalled Buddhist deity, with upper portion broken and* 107, *inscribed fragmentary stone slab*

Plates 108-109



108



109

Udaygiri-2: 108, *terracotta plaque showing Buddha and* 109, *red ware sprinkler*

externally projected chambers on southern side measuring the western one 1.56m in width while length is obscured while the eastern one was 1.00m X 1.30m.

Traces of niches were also visible on the southern and the western walls. On the northwestern corner, an externally projected shrine chamber was exposed. This chamber (1.84m X 1.32m) slightly better preserved, yielded stone door-sill and stone set partly on floor, the upraised base for holding image is noteworthy (pl. 102). Traces of the externally projected shrine chambers were found on the northern side, the western one measuring 1.50 m sq and the eastern one (1.50m X 2.05m) which is better preserved having its door-sill and stone pedestal for enshrining the deity.

On the southeastern side below the wall was traced the drainage system running almost parallel to the outer part of the wall on this side and at the north corner of shrine-complex which takes a turn towards east. Stones used for the drainage system are mostly the re-used architectural members. On the southern side of the stairs attached to it was a brick-paved structure (2.57 X 2.41 m), apparently a later addition. Here a rectangular structure of reused bricks, separated into two halves on a gap of 25 cm, found associated with ash, burnt-clay lumps and soot on bricks probably indicatng its use as a hearth. This hearth was also a later addition as it was erected over debris on the edge of drain. Area in front of the shrine-complex was provided with brick-jelly floor which appeared in patches.

Besides the standing image of Avalokitesvara from the Avalokitesvara area, datable to *c.* eighth century AD, the site yielded various antiquities mostly datable between *c.* eighth and twelfth century AD. Stone antiquities comprise images of Buddha and Bodhisattva (pl. 103), heads of Bodhisattva (pl. 104), bust and lower body of various divinities (pls. 105-106), unfinished image of Ganesa, fragmentary stone inscriptions (pl. 107) and architectural fragments. Terracotta antiquities were sealings with Buddhist creed, plaque depicting Buddha (pl. 108), animal figurines, female figurines, ear-studs, beads, wheels etc. The most interesting one was a potsherd depicting human face. Large iron nails, hooks and a sickle-like implement were recovered from the water reservoir. Iron arrow-heads and a rod, copper finger ring and knob of a sprinkler were found besides two bronze sculptures of Buddha in *abhaya-mudra* (36 X 10 X 6 cm) and Bodhisattva (30.5 X 6.5 X 3.5 cm). In addition to these, twenty-four votive stupas of different dimensions and designs were also unearthed from Avalokitesvara area, two such stupas were bearing inscription *"ye dharma hetu...."*. The bottom has a stupa with Buddha in *bhumisparsha-mudra* in its niche. Most of the sculptures and architectural members from Avalokitesvara area were defaced and deliberately broken suggesting some vandalism at the site.

The medieval ceramic industry though not of much significance also furnished some interesting shapes. The water reservoir yielded good number of potsherds, mainly comprising sprinklers in red (pl. 109), grey and black ware. Among other wares, red ware, dull red ware, black ware and grey ware are important with shapes such as carinated *handis,* high-necked pots, dishes, bowls, basins, rimless storage-bins, lamps, censers, spouted vessels and miniature pots etc. Bulk of the pottery was wheel-made, well-fired, containing decorations like triangular notched design on rim and parallel incisions on shoulders of pots and *handis.*

PUNJAB

54. EXCAVATION AT DHALEWAN DISTRICT MANSA

Excavation was carried out at Dhalewan, District Mansa, by the Excavation Branch II, Delhi, of the Survey, under the direction of Madhu Bala, assisted by Vishnu Kant, Ajay Srivastava, P.K. Mishra, Jitendra Sharma, V.P. Verma, Vinod Kumar, Ram Kumar, Subhash Chand, Chhotey Lai and Nityanand.

The excavation at Dhalewan yielded a sequence of three cultures starting from the remains of Early Harappan culture in Period I, divisible into three sub-periods in a deposit of about 3m; Period II re-occupied by the Kushan people after a lapse of considerable time; Period III Gupta and post-Gupta and later remains with a deposit of 2 to 3m.

Period IA is marked by a deposit of about 80 cm over the natural soil and below the outer face of the fortification of sub-Period IB. Early Harappan pottery was found from this deposit. This shows the first occupational deposit of the Early Harappans at the site.

Period IB is represented by a fortified Early Harappan settlement. The mud-brick fortification wall running towards north-west to south-east was about 2 m wide and 28 m long. It contained a rectangular projection of 8 X 6 m at the north-west end. The settlement is found in the western side of the fortification. Two circular kilns *(bhatti)* along the inner side of fortification and two partly exposed rooms with evidence of burning and a 2 m wide separate entrance, found in sub-period, indicate industrial activity (pl. 110).

With this excavation at Dhalewan the site emerged as an Early Harappan settlement evolving into a Harappan settlement with houses and fortification of mud-bricks (1:2:3 and 1:2:4) in sub-Period IB. The pottery from this deposit consists of Harappan sturdy ware and perforated jars along with Early Harappan pottery and all types of terracotta cakes (pl. 111).

A deposit of 1 X1.50 m, represents Period IC showing change in settlement pattern. The entire inner settlement was planned and constructed *de novo*. This sub-period contains two structural phases. The fortification found in the previous sub-period was also used in this sub-period. The circular kiln, two pots and multiple hearths in a partly exposed room with small circular oven represent another phase (II) of this sub-period. A circular kiln, two pots and the multiple hearths found altogether with steatite beads near the pots and also from the pot suggest an industrial area probably for manufacturing steatite beads. The other finds include cubical weight of stone, parallel-sided chert blade, painted Harappan pottery, etc., indicating a full-fledged Harappan occupation. The site was completely deserted after Period IC for a long time.

Pottery of Period 1 is akin to the pottery found in the Early Harappan context at Kalibangan in Rajasthan and Banawali in Haryana. Almost all the fabrics are available at Dhalewan which are met with at Kalibangan and Banawali. Pottery included dish-on-stand, bowls of red ware as well as of grey ware, fragments of perforated jars, goblets, thick and sturdy fragments of basins in Fabric D having incised decoration on the inner side, mono-chrome and bi-chrome decorated pottery etc. Noteworthy finds of Period I are all types of cakes

Plates 110-111



110



111

Dhalewan: 110, *rooms with evidence of burning, Period IB and* 111, *pottery from Period IB*

such as triangular, circular, *mustikas,* found in various sizes. Some cakes have mat impressions also.

Antiquities, like terracotta, faience and shell bangles, plain as well as decorated, cubical weight of stone, parallel-sided blade, beads of lapis luzuli, carnelian, agate and steatite, terracotta wheels and fragments of cart frames, terracotta bulls, bone points, gamesmen, sling-balls etc. were found in addition to the graffiti marks on pottery akin to the Harappan signs.

The site was re-occupied in Period II (Kushan), after a lapse of time. Mud-brick structures, portable hearths, multiple hearths, incurved rim bowls, sprinklers, decorated pottery, copper coins, arecanut-shaped terracotta beads, terracotta figurines, etc., are among the important finds of Kushan period.

Period III (Gupta/Later): Over the open part of Early Harappan occupation, circular and deep pits were dug for clayey soil and for dumping the refuse. The structures are made of mud lump walls. Hearths have also been found. Sharp-edged bowls, handled-incense burners (lamps), tiles, lid, etc. are the other characteristic finds of this period.

55. EXCAVATION AT CHHAT, DISTRICT PATIALA

Under the supervision of K.K. Rishi, assisted by Kuldip Singh, Gurdev Singh and Pradeep Singh of the Directorate of Archaeology and Museums, Government of Punjab, Chandigarh, Trenches A-1, B-l, XA-1 A-2, B-2, XA-2 A-3, XA-3, B-3 and Cl, measuring 10 X 10 m each, were laid out. During the course of scientific clearance, three underground rooms, four stairs, and a courtyard in *lakhauri* bricks were exposed. The walls are built in *lakhauri* brick mixed with lime. All the rooms are connected with stairs. These rooms have lime floors, fountains, water channels, water falls, shallow niches, ventilators and drains for the disposal of fountain water. There is also a contemporary well adjoining the complex which was a source of water for the occupants. The rooms are cooled by circulating fresh water through underground channels from the well. The water which was coming through the channels kept the complex cool in summer and warm in winter. The room in the middle, which is in a dilapidated condition and without roof, was exposed besides a water fall with square pattern.

The rooms were numbered as 1, 2 and 3, measuring 6.48m X 4.45m, 5.30m X 3.01m and 6.40m X 4.98m respectively. These underground rooms might have been a property of some rich nobleman. It also depicts the lifestyle of a princely personage in the sixteenth-seventeenth centuries in Punjab. These structures are of first phase, whereas the second phase structures were superimposed over structures of the first phase.

During the scientific clearance knife-edged bowls, *kunalis,* cooking vessels, *handis,* incense burners, etc., were recovered. Antiquities like glass bangle pieces, terracotta balls, wheels and beads of semiprecious stones were also found.

After clearing the structures of the later-Mughal period in the above mentioned trenches, some areas of Trench B1 and B2 was taken up for further probing, so that the sequence of cultures at the site could be ascertained. In all the trenches, the upper strata of the later-Mughal period was badly disturbed by brick robbers and the disturbance was noticed in the shape of robbed walls and structures. However, five layers of this period could be noticed. As far as the sixth layer, at this place is concerned, it belonged to earlier period

containing mixed potsherds of grey ware, black-slipped ware, and PGW, though their habitation was not noticed. Total eight layers were excavated of these layers (6) (7) and (8) contained grey ware, black-slipped ware and PGW. The quantity of PGW increased with the depth. The virgin soil was touched at a depth of 6.95 m from the top. Some minor antiquities like terracotta bulls, wheels, a toy-cart frame, bone stylus, terracotta beads, semi-precious beads, etc., were collected from the above three layers. After excavating in this quadrant upto the virgin soil, the antiquity of Chhat mound could be traced back to the tenth-eleventh centuries BC.

The important feature of this excavation is a ring-well, belonging to the Kushan period. The ring-well appeared at a depth of 4.80 m sealed by layer (6). The diameter of this ring-well is 76 cm with each ring measuring 10 to 12 cm in height and 2 cm in thickness. In all forty-five courses of this ring-well were exposed measuring 5.95 m in total length.

The discovery of this ring-well is important to know the ancient soakage system that was in use by the individual house owners as well as of collective sewage of waste water through these ring-wells. There were two systems for sewage, one described above and the other was piling of perforated jars, one above the other, vertically placed in a deep pit, so that water could pass freely downward. Both the systems were reported from other sites like Hastinapura and Ropar.

RAJASTHAN

56. EXCAVATION AT OJIYANA, DISTRICT BHILWARA

The Jaipur Circle, of the Survey, under the direction of B.R. Meena and Alok Tripathi, assisted by K. Singh, B.R. Singh, S.C. Gupta, Aphariya, carried out excavation at Ojiyana, located about 30 km south-west of Beawar in hilly region of District Bhilwara. The site is unusualy located on hill slope, which makes it unique among other sites of Ahar culture, which flourished in river valleys.

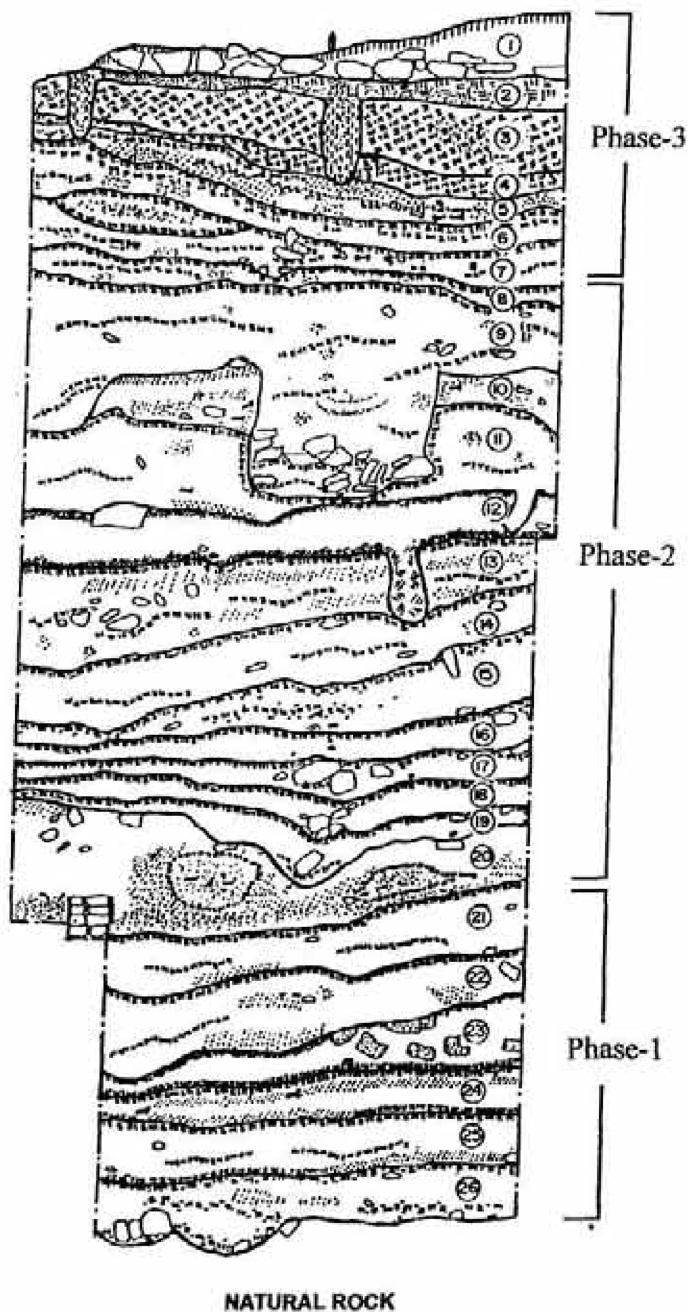
Excavation on the northern slope of the hill, towards vast reservoir, revealed a single culture deposit. This thick deposit of about 7.5 m is perhaps maximum among all the excavated sites of Ahar culture. The entire deposit is divided into three phases based on the pottery and structural evidence (fig. 9).

The first settlers were perhaps cultivators and preferred this hillock, skirted by low lying fertile land for their settlement. These white painted black-and-red ware users perhaps came from the plains and settled on the natural rock. No complete house plan of phase I was unearthed but thin patches of mud floors right above the rock and thick deposit of construction debris suggest that their houses were made of sun-dried mud-bricks.

The houses made of mud-brick did not prove very useful on the hill slope and in phase II they started using locally available stones for construction. A multi-chambered house-complex in phase-IIB marks the development in structural activity. This house complex located to the north of 1.25 m street had four chambers built on a platform. One of the chambers had a low platform along the southern wall for keeping utensils, etc. A big saddle-quern was also fixed on the floor for grinding grains. The chamber next *to* it was the kitchen with three *chulhas* of different sizes built in a row. It also has open courtyard and living

EXCAVATION AT OJIYANA 1999-2000
DISTRICT BHILWARA (RAJASTHAN)
SECTION FACING WEST

0 1
METRE



Plates 112-113



112



113

Ojiyana: 112, *terracotta figurines of bull and* 113, *cow*

Plates 114-115



114



115

Ojiyana: 114, *variety of beads and* 115, *terracotta wheels, beads and spindle-whorls*

rooms. Although the houses were built of stones but mud-bricks were also used for partition walls.

Wattle-and-daub houses in phase HI mark a sharp decline. Thick layer of ash, burnt and baked pieces of mud-plaster and post-holes capped with charcoal, indicate a devastating fire which destroyed the last settlement on the site.

Although painted black-and-red ware is present in all the phases, a change in shapes and firing technique is clearly marked. Paintings were executed both on the exterior as well as on the interior. The frequency of bowls is less in phase I which increases in phase II. The firing technique of pottery in phase III was different from earlier two phases. Red ware remains the main ceramic type found in all the phases. Other associated wares are black-slipped ware, burnished and unburnished-black ware, grey ware, tan ware and red-slipped ware. Besides painting, pots are decorated with incision, pinching and applique designs. Thick storage-jars bear applique designs whereas other techniques of decoration were used on medium-to-thick pots of other wares..

The excavation revealed some unique antiquities, particularly a large number of terracotta bulls, both naturalistic and stylized, presenting a great variety of shapes and size (pl. 112). White paintings on these bulls make them unparallel in contemporary cultures in India. These white painted bulls, being unique, may also be termed as Ojiyana Bulls which perhaps served as cult objects and as it appears white painting was applied during the ceremony or rituals. Another important discovery is the terracotta figurines of cow (pl. 113). Modelling of cow here was quite common as is evident from the veriety of modelling. These were also perhaps the cult objects.

A small chopper made of thin sheet of copper is an important antiquity *of* Ahar culture. Faience beads of Harappan type are also noteworthy to establish relationship with other contemporary cultures.

A good number of beads of carnelian, agate, faience, shell, steatite, stone and decorated beads of terracotta of various shapes and sizes were also found (pl. 114). Bangles of copper and shell, ring of copper and pendant are other noteworthy ornaments in addition to toy-cart wheels with incised spokes, spindle-whorls (pl. 115). hopscotches, sling-balls in terracotta and saddle-querns, mullers, hammer-stones in quartz, ring-stones, etc. A large number of saddle-querns and hammer-stones, some of which, were probably used for agricultural products, constitute an important aspect.

The excavated features and finds in various phases show cultural continuity, a phenomenon of permanent settlement, besides the inherent growth, development and decline along with the assimilation of new ideas, to the cultural development. The habitational period could be bracketed, tentatively, between third millennium BC to mid-second millennium BC on the basis of relative chronology offered by the comparative study of other sites.

57. Exploration in Districts Jaisalmer and Barmer

During the course of prehistoric exploration in southeastern part of District Jaisalmer and adjoining northeastern part of District Barmer, the Jaipur Circle, of the Survey, under the direction of B.R. Meena and co-direction of Alok Tripathi,

assisted by Kanwar Singh, B.R. Singh, Rajendra Yadav and R.P. Mathur discovered the following sites:

Locality	***Nature of remains***
District Banner	
Mehreri Navi (26°30'31"N;71°27'07"E)	Lower Palaeolithic tools
Olecha (26°29'30"N;71°27'20"E)	Lower Palaeolithic tools
District Jaisalmer	
Adam Khan-ka-Dera (26°56'50"N;71°52'43"E)	Lower and Middle Palaeolithic tools
Barli (26°51'30"N;71°54'E)	Lithic tools
Bhainsra (26°36'40"N;71°25' 15"E)	Middle Palaeolithic tools
Bhagu-ka-Gaon (25°55N;71°10'E)	Lower Palaeolithic tools
Baroragaon (26°56'50"N;71°52'43"E)	Lower and Middle Palaeolithic tools
Bhope-ki-dhani (26°47'25"N;71°16'E)	Lower Palaeolithic tools
Bilia (26° 55'N; 71° 52'E)	Flake tools
Gudi (26° 49' N; 71° 47' E)	Core and flakes
Inder Singh-ki-Dhani (26°52'15"N;71°10'35"E)	Middle and Upper Palaeolithic tools
Kelawa (26°55'N;71°49'E)	Stone tools
Kunda (26°10'30"N;71°54'20"E)	Stone tools and historical pottery

Locality	*Nature of remains*
Luna (26° 42'N; 71° 34'E)	Stone tools
Madasar (26°46'30"N;71°29'44"E)	Upper Palaeolithic tools
Mahesha (26°55'N;71°41'E)	Stone tools
Malusar (26°0r05"N;71°25'15"E)	Middle and Upper Palaeolithic tools
Marwa (26°45'N;71°53'30"E)	Stone tools
Mehreri (26°32'40"N;71°26'28"E)	Middle Palaeolithic tools
Modha (26° 16' 15"N;71°59'40"E)	Stone tools and historical pottery
Moklat-1 (26°55'30"N;71°02'30"E)	Middle and Upper Palaeolithic tools
Nananiyai (26°52'N;71°45'15"E)	Stone tools
Pokaran (26°54'N;71°54'E)	Flakes, stone tools
Rajgarh (26°33'38"N;71°30'E)	Middle and Upper Palaeolithic tools
Rasla (26° 45'N; 71° 43'E)	Stone tools
Sanawra (26°51'N;71°34'E)	Scrapers and flakes
Sankara (26°43'30"N;71°03'E)	Stone tools

Locality	*Nature of remains*
Solankio-ki-Dhani-I (26°54'N;71°12'25"E)	Lower Palaeolithic tools
Slankio-ki-Dhani-2 (26°53'43"N;71°13'30"E)	Lower Palaeolithic tools
Sujan Singh-ki-Dhani (26° 53' 10"N;71°02'30"E)	Lower Palaeolithic tools
That (26°50'N;7r51'E)	Core and stone tools
Uttam Singh-ki-Dhani (26°48'45"N;71°15'48"E)	Lower Palaeolithic tools

58. EXPLORATION IN DISTRICT SAWAI MADHOPUR

During the course of Exploration along the Banas river from Isarda to Bharoti, Jaipur Circle, of the Survey, under the direction of B.R. Meena. assisted by Kanwar Singh, B.R. Singh and R.P. Mathur discovered the following sites.

Locality	*Nature of remains*
Aincher (26° 10' N; 76° 07'E)	Late medieval site with fortress and temple (eighteenth century)
Bagina (26° 09' N; 76° 07' 25"E)	Temple (seventeenth-eighteenth century)
Bagroli (26° 13'40" N; 76° 11'E)	Early historical site
Bahnoli (26°14'N;76°13'E)	Early historical site
Bandhawal (26°15'N;76°09'E)	Microlithic site
Bhagwatgarh (26° 08' 40" N; 76° 15'E)	Fortress, temples, step-wells, *chhatris* (eighteenth century)

Locality	*Nature of remains*
Dahlod (26°13'N;76°22'E)	Fortress (mid-eighteenth century)
Dashewali (26°12'4O"N;76°19'E)	Early historical site Temple
Didaich (26° 08' N; 76° 06'E)	(eighteenth century)
Didwari (26°14'N;76°16'E)	Early historical site and fortress (eighteenth century)
Dobra (26° 1l'20"N;76°19'E)	Early historical site
Golpur (26°15'N;76°09'30"E)	Step-well (nineteenth century)
Hathdoli (26°12'30"N;76°16'20"E)	Early historical site
Hindupura (26° 14' 30"N; 76° 14' 30"E)	Temple and step-well (eighteenth century)
Isarda (26°09'N;76°01'30"E)	Temple, fortress, step-well, shahibagh and late medieval site
Jharauda (26° 12' 30"N; ong 76° 09'E)	Early historical site, temple and inscriptions (eighteenth century)
Jharkund (26°07'N;76°10'E)	Temple and inscriptions (eighteenth century)
Jhonpara (26°10'N;76°10'35"E)	Early historical site
Jolanda (26°13'30"N;76° 18'15"E)	Fortress (eighteenth century)
Laduta-ki-Dhani (26°11'N;76°16'E)	Lower Palaeolithic tools and early historical site

Locality	*Nature of remains*
Maheshra (26° 13'N; 76° 18'E)	Early historical site
Nimod (26°12'N;76°09'E)	Early historical site
Raipura (26° 07' 30"N; 76° 0.0'E)	Medieval site
Sarsop (26°H'N;76°04'E) -	Fortress (seventeenth - eighteenth century)
Sheopur (26°08'N;76°03'20"E)	Early historical site
Shiwarh (26°12'N;76°02'E)	Temple and fortress
Sirohi (26°09'N;76°12'E)	Medieval site
Surang (26°12'N;76°20'E)	Black-and-red wares and early historical site

59. EXCAVATION AT BALATHAL, DISTRICT UDAIPUR

In continuation of the previous season's work *(1993-94,* pp. 93-97; *1995-96,* pp. 64-70; 7996-97,pp. 90-100; *1997-98,pp.* 145-153; *1998-99,* pp. 142-149), excavation at Balathal was carried out by V.N. Misra and R.K. Mohanty of the Deccan College Post-graduate and Research Institute, Pune and Lalit Pandey and Jeewan Kharakwal of the Institute of Rajasthan Studies, Rajasthan Vidyapeeth, Udaipur. The excavators were assisted by Shreekant S. Jadhav, B.B. Dighe, D.D. Phule, S.A. Pradhan, Sunil S. Jadhav and Ravi Dhamapurkar, V.S. Gavade V.S. Bhatavadekar, Manoj Chavan and H.S. Balakrishan, Abhijit Dandekar, Jitu Mishra, Tama Panda, Anup Mishra. M.D. Kajale, Anupama Kshirsagar, P.K. Thomas, P.P. Joglekar and Arati Deshpande participated in the excavation for specialist studies besides M.A. and M. Phil students of the Department of Archaeology, Deccan College and Diploma and B.A. students of the Institute of Rajasthan Studies for training.

The objectives of this season's work were to expose the remaining part of Structure 32 excavated in Trenches F3, E3 and D3 inside the fortified enclosure last year; to uncover further structural and material culture below Structure 32 and

BALATHAL : 1994 - 2000
PLAN OF CHALCOLITHIC STRUCTURES

5 0 5 10 15 20 METRES

Phase VI Pottery Kiln
Phase V Pottery Kiln
Mustard Seeds
Phase VII
Phase VI
St. 9
PLATFORM
Phase VI
ENTRANCE
St. 11
St. 14
St. 15
St. 13
St. 10 K
St. 10 J
St. 10 I
St. 10 H
St. 10 G
St. 10 F
St. 10 E
St. 32 C
St. 32 A
St. 42
St. 43
St. 44
St. 41 A
St. 41
St. 35
St. 37
St. 38
St. 39
St. 34
St. 34 B
Gutter
Water Channel

LEGEND

- BAULK
- QUERN
- BURNT PATCH
- COMPACT SOIL
- STONE
- MUDBRICK

CUTTINGS SHOWING STRUCTURES 45, 45 B & 46

R 13
R 14
St. 45
St. 46
St. 45 B
St. 45



to extend the area of excavation inside the fortified enclosure and dig down to the virgin soil for obtaining a better information on the origin and evolution of the Chalcolithic culture; to further expose the outer wall and the structures associated with it on the eastern edge of the mound and to excavate a new trench on the northern periphery of the site to know the extension of the Chalcolithic settlement.

To achieve these objectives, eighteen new trenches, each measuring 5 X 5m, were fully or partially excavated over an area of 246.2 sq m. Trenches E4 D4, C4 and a part of B4 were dug inside the fortified enclosure to determine its function and to search for the evidence of the early stage of the Chalcolithic occupation. Trenches OA11 (SE, SW & NE) and parts of A12 (SW, NE and NW), A13 (SW, SE and NE), B12 (SE and SW), B13 (SE and SW), OA12 (NE and SE), OA13 (NW and SE), OA14 (NW and SW), OB11 (NE, NW and SW), OB 12 (NE and SW) were dug to uncover Chalcolithic structures and to understand the nature of the outer wall on the eastern edge of the mound. Parts of Trenches Q13, Q14, R13 and R14 were dug in an agricultural field beyond the northern limit of the mound to understand the extension of the Chalcolithic habitation on the northern side (fig. 10). Besides, digging was also done in previously excavated trenches, namely F3,E3,A13andOA13.

The Chalcolithic period at Balathal has been divided into two phases, A and B, on the basis of stratigraphy, architecture and material culture. Phase A is marked by the relatively poor quality of pottery, paucity of incised decoration in thick red ware and the absence of deluxe ceramics like tan ware and thin red ware as also of monumental architecture. Painted black-and-red ware is present but it is comparatively coarse. Occasional beads of agate and steatite, copper fragments and bone tools are other finds of this phase.

Phase B is marked by superior quality of pottery, abundance of incised decorative motifs in thick red ware, comparative rich material culture and the appearance of deluxe wares like tan and thin red and of monumental architecture. Phase A can be dated on the basis of stratigraphy and radiocarbon dates to c. 3000-2400 BC and phase B between 2400 and 1500 BC.

Four structural levels of phase A were identified in the course of this year's excavation. On the basis of evidence from Trench HX2 on the western edge of the mound it appeared that the pioneering settlers lived in circular huts having well-made floors. But this year's excavation revealed four phases of stone-built constructional activity in Trenches E4 and D4 in the central part of the mound. Even though no complete plan of a structure of the early phase was recovered, remains of rectangular houses of various sizes having several courses of meticulously arranged stones in the foundation walls were exposed in Trenches E4 and D4. This evidence clearly shows that the Balathal people were making stone-built houses from the very beginning of their settlement.

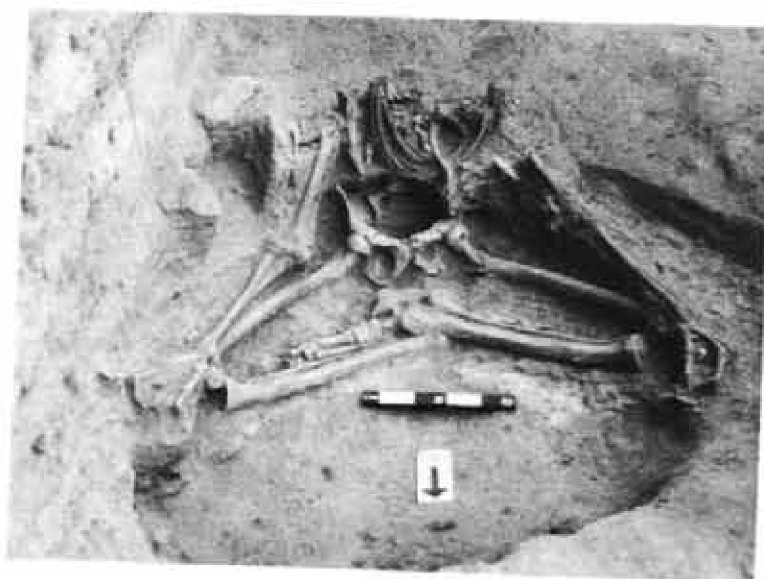
Phase B, already very well known from extensive excavations in the southern part of the mound, was further exposed in three different areas, namely (a) in the central part of the fortified enclosure; (b) on the eastern periphery and (c) on the northern extremity of the mound.

Digging inside the fortified enclosure was done in Trenches F3, E3, D3, E4, D4, C4 and B4.

Plates 116-117



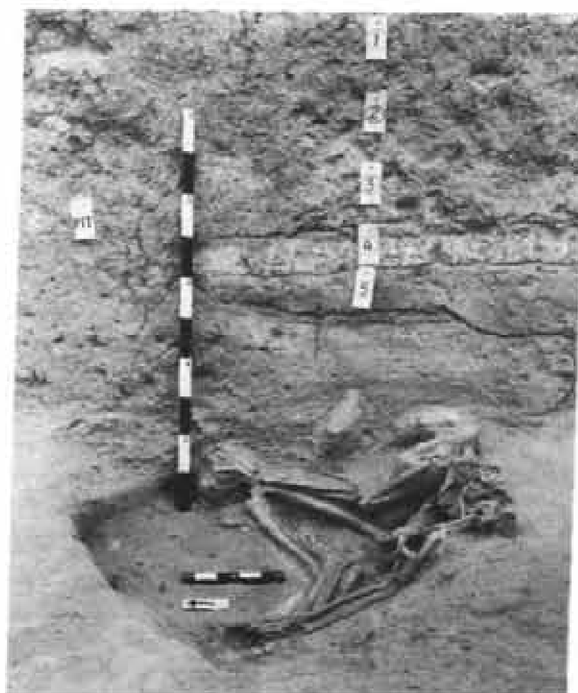
116



117

Balathal: 116, *human burial (no.2), E4 (NW), layer 6, Chalcolithic and* 117, *human burial (no.3), B4 (NE), layer 5*

Plates 118-119



118



119

Balathal: 118, *burial (no.3) and western facing section of B4 and* 119, *Chalcolithic structures of phase A (pre-fortification) in E3, E4, D3 and D4 (st. 32A, 42, and 44)*

Trenches E4 and D4 were opened this year and were dug down to the virgin soil. Layers 1-5 yield early historic material as elsewhere on the site.

Layers 6 and 7 in these trenches, as in other trenches dug inside the enclosure in previous years, are entirely composed of burnt cow-dung and ash. The cow-dung was burnt at various temperature in different areas in multiple episodes over a long period of time. This is clearly attested to by the considerable local variation in the composition of layers in respect of colour and compactness of the ash and structure of cow-dung cakes. The thickness of ash and cow-dung in these trenches is 2.80 m. However, in the southern part of D4 the ashy layers suddenly slope downward both from the northern and southern sides into a pit, which was a natural hollow feature in the basal rock. The thickness of the ash in this pit exceeds 5.50 m but its bottom was not traced. Layers 8 and 9 are composed of a mixture of ash and sand and do not contain cultural material in significant quantity.

This year three human burials were found inside the fortified enclosure. These were numbered 2 to 4 since burial No.1 was found in 1996-97.

Burial 2 was found near the top of layer 6 in Trench E4 (NW). It consisted of skull, jaws and bones of upper part of the body, all of which are in an excellent state of preservation. The arrangement of the bones, specially the folding of the arm bones, upside down position of the mandible, location of the two scapulae close to each other, and position of the ribs to the left of the arm bones all suggest that it was a secondary burial. The burial was associated with a small globular red ware pot of late Chalcolithic period (pl.116).

Burial 3 was found in Trench B4 in layer 5, sealed by layer 3, layer 4 having been cut by the burial pit. The body, facing north, was interred in a sitting posture. Two circular clay rings, of which the function is not clear, were made around the burial. The skull and other bones of the upper part of the body are missing, probably having been destroyed by the weight of the earth placed over the burial. The arm and leg bones, including the delicate hand and foot bones, are, however, very well preserved. The body was placed in an upright posture with legs drawn apart, feet placed one above the other and the hands placed on the knees in a meditating *(yogi)* position. All the bones were in their articulated positions (pls. 117-118).

Burial 4, represented by an adult skeleton, oriented EW, was found in Trench D4, in layer 6, 60 cm below the top of layer 6. It was placed on a compact surface made of burnt cow-dung, with a few small stones placed irregularly on the surface. The head was resting on a flat stone (28 X 20 X 11 cm) which was supported by a smaller stone (15 X 18 X 9 cm). A few stones were placed below the hip and knee portion of the skeleton. All the bones are perfectly articulated. Two carnelian beads (fashioned as eye beads) was found *in situ* on the abdomen. A copper pin was placed near the right hand. The skull is thick but porous.

A skeleton of a three-month old calf, apparently representing an intentional burial, was found in Trench E4 (SW) in layer 7 at a depth of 2.50 m. Apart of the skeleton, which lay in Trench E3, was removed in the last year's excavation. The remaining part was found placed in an ashy bed dug into layer 7. P.K. Thomas considers the burial that was done soon after the death, as the limb bones are perfectly articulated.

The deposit of phase A of the Chalcolithic period in Trenches E4 and D4 is 1.85 m and it occurs in layers 10 to 12 below the base of the fortification wall. In the previous season structure 32 represented by a long wall running NS and a part of Structure 32 A represented by an EW running wall emanating from STR 32 were encountered in Trenches F3, E3 and D3.

Structure 32A (pl. 119) is represented by two walls, one running EW and the second running NS. The EW running wall occurs in Trenches E3 (NE) and E4 (NE and SE). It has a length of 6.0 m and a width of 90 cm and is joined to STR 32 at its western end. The wall is made entirely of stone slabs, the size of the slabs ranging from 36 to 12 cm. Adjacent to the walls an area covering 1.40 m (EW) X 1.0 m (NS) is paved with complete and broken mud-bricks and represents a floor. The (NS) running wall is located at a distance of 2.40m from the eastern edge of STR 32. It has a length of 2.60m. At its northern end it joins the fire place in the NE quadrant of E4. The three walls enclose a rectangular room with a mud-brick paved floor. Structures 32 and 32A belong to the last phase of the pre-fortified structural activity.

Structure 42 is represented by an EW running wall which is connected to the eastern part of 32A. This wall is 25 cm lower than 32A and was exposed to a length of 2.50 m. It probably extends further east under the section of E5 and is sealed by layer 12. The exposed height of the wall is 75 cm and it is made of eleven courses of stones.

Structure 43 is represented by an EW oriented wall in E4 (SE). The top of this wall is 70 cm lower than the top of Structure 42. This wall has a length of 2.50 m and a height of 55 cm and consists of six courses of stones. STR 32A rests over STR 43 on its western side. This wall is sealed by layer 14. In front of this structure on the southern side a platform made of mud-bricks is seen. It has a length of 1.30 m and a thickness of 20 cm.

Structure 44 is represented by a compact stone-paved floor and is exposed only in E4 (SE). The floor is made of very compact clay, mixed with ash. It is exposed over an area of 2.30 m EW and 1.10 m NS. This platform is situated 15 cm below STR 43. At the moment this platform appears to represent the earliest structural activity inside the fortified enclosure.

Excavation in the eastern extremity of the mound revealed that the eastern part of the mound was disturbed by cultivation and by an irrigation channel, dug in recent years at the edge of its intact part. This part of the mound has only a few centimeters thick deposit of the early historic period. The Chalcolithic deposit is, however, present everywhere. Excavation in this part was undertaken in Trenches OA11 (NE, SE and SW), A12 (NE, SE and SW), A13 (SE, SW and NE), B12 (SE and SW), B13 (SE and SW), OA12 (NE and SE), OA13 (NW and SE), OA14 (NW and SW), OBI 1 (NE, NW and SW) and OB12 (NE and SW). It revealed several structural features. These are briefly described below.

Structure 34A, a stone platform in Trench A13, oriented NS, was exposed to a length of 2.90 m (NS) and a width of 1.60 m (EW). It has a height of 1.05 m. It is made up of six courses of stones of various sizes. The biggest stone slab is 90 cm long x 15 cm thick. The smaller stones vary in length from 30 to 10 cm. The stones are joined together by mud-mortar. The base of the platform rests over Chalcolithic habitation debris. This platform, located on the northern side and projecting

east-wards, is joined at its southwestern end by another bigger platform which is also oriented NS. This second platform has a length of 4.70 m and a height of 1.35 m. It is made of nine courses of stones of varying sizes. The platform is bulging in the middle towards the east and rests over Chalcolithic habitation deposit rich in ash and potsherds belonging to cultural phase B. It proceeds westward under a later structure described below. Its width cannot be estimated as the remaining part was not dug.

Structure 34B, also a platform, rests over STR 34A but is 30 cm to the west of the outer edge of the latter. This platform has a length of 4.35 m and a height of 65 cm. It is made up of six courses of stones and is remarkably straight on its eastern exposed face. At its southern end the platform is joined by an EW running wall which has an exposed length of 8.0 m, a width of 60 cm and a height of 35 cm. It is made of three courses of stones. On its northern side this wall is joined by mother wall which has a length of 5.10 m, a width of 50 cm and an exposed height of 10 cm.

Structure 34C was exposed in an area of 2.8 m (NS) and 2.8 m (EW) to the north of the NS running wall of 34B at the junction of A13 (SW) and OA13 (NW). It consists of heavily burnt ochre coloured earth and was evidently a fire-place which was in use for a long period of time. Close to the northern end of this structure there is a circular clay oven. The inner diameter of the oven is 36 cm and the thickness of its wall is 3 cm. The wall of the oven, which tapers downwards, is heavily burnt from ochrish to dark reddish colour. Around the oven there are large chunks of heavily burnt-plaster. These chunks measure upto 25 cm in length, 20 cm in width and 2-5 cm in thickness and show that the area around the oven was thickly-plastered. Inside the oven there is a thick deposit of dark ash and also a few potsherds. It is a Hat-based oven and has survived to a height of 20 cm. On its northern side the oven is enclosed by an EW running mud-wall having width of 40 cm and an exposed length of 2.40 m. At its western end the wall is buried under unexcavated deposit. The outer (northern) edge of the wall is 50 cm to the north of the oven.

STR 35 is situated 1.40 m to the north of the east projecting platform in Trench A 13 (NW). It NS running stone wall is exposed to a length of 6.70 m and its northern end is buried under the deposit of the western side of the irrigation ditch cut by the farmers in B13 (NW) and B12 (NE). The ditch has a width of 70 cm and cuts through the wall which is visible in its western section. The wall has a width of 90 cm and a height of 1.40 m. The NS running wall at its southern end (which proceeds across the ditch) turns west.

STR 35 A is located 90 cm to the west of the wall of Structure 35 which proceeds across the ditch. The surviving length of one of the walls of this structure is 3.90 m and a width of 1.40 m. At its southern end this wall is joined by another wall which is exposed to a length of 1.80 m. At its western end it is buried under unexposed part. The E W running wall has a width of 75 cm. Its height is not known, since, the area around it has not been excavated. Between the two walls in the unexcavated section there is a patch of 1.5 X 1.0 m (NS) and with a height of 30 cm (seen in the east facing section). This patch is made of burnt earth of ochre colour and is similar in composition to the oven area of 34C. In this patch there are lumps of 2 to 4 cm thick plaster suggesting the existence of another clay oven.

About 90 cm to the east of the long wall of the platform of STR 35 which proceeds across the ditch, there are remains of another structure STR 36 in B13 (SW and SE). A wall of this structure, oriented NS was exposed to a length of 2.60 m, a width of 75 cm, and a thickness of 35 cm. It is made of three courses of stones. A large broken quern was incorporated in the wall at its southern end. The structure is partially buried under the deposit of undug portion to the ditch and the agricultural field in the east.

STR 37 is situated 2.65 m to the west of the NS running wall which encloses the oven area of STR 35. An EW running wall appears to the south of STR 35. It has a length of 5.20 m, a width of 65 cm and a height of 55 cm. The wall, which has survived with six courses of stones, rests on Chalcolithic occupational debris. At its northeastern end this wall turns south and is exposed for a length of 1.80 m. Its southern portion seems to have been levelled by the former. It has a width of 90 cm and a height of 40 cm. The EW running wall was partly destroyed by the irrigation ditch.

To the west of this structure and at a distance of 55 cm from its shorter wall, there is another stone wall running NS, parallel to the damaged wall. Its length is 3.25 m and width 95 cm. In the centre it had loose filling and when it was dug, it looked like a channel. The stones of this wall are arranged in a vertical orientation, i.e., the broader face to the centre, leaving a gap of 25-30 cm and a depth of 20 cm. This drainage type of structure slopes in a NS direction which is the natural gradient of the deposit of the mound at this place. This wall appears to have served as a drainage to a house. It belongs to phase B of the Chalcolithic occupation.

STR 38, partly excavated in Trench OA11, is represented by a wall which, at its western end, is joined to another wall oriented NS. This NS wall is preserved to a length of 80 cm. Touching the western edge of the smaller wall is another NS wall, which is exposed to a length of 2.80 m, a width of 85 cm and a height of 50 cm. The lower part of the wall is made of mud-bricks and the upper part of stones. At its southeastern end the NS running wall is joined by an EW running wall in the southern part of Trench O A11. It has a length of 3.65 m, a width of 80 cm and a height of 60 cm. Five courses of stones are visible in the wall. The two walls enclose a small space of 1.7 m (EW) X2.15 (NS). In the south facing section of Trench OA11 (NW) a wall of six courses of mud-bricks is exposed. It has a width of 75 cm and a height of 65 cm. The size of mud-bricks is 24 X 16 x 10 cm. These bricks, arranged in header and stretcher, are made of dark brown clay and are joined by a dull white to light grey clay mortar. All these structures belong to the second phase of the Chalcolithic period.

STR 39 is formed of one long wall and three shorter walls. The length of the long wall (EW) is 5.15 m and its width is 65 cm. It has survived to a height of 35 cm. It has three courses of stones which rest on habitation debris. There is a gap of 90 cm between this wall and the (EW) running wall of STR 38 C.

At its eastern end, this wall appears to be connected to the NS oriented wall, partially destroyed by the irrigation ditch, but is visible in the habitation deposit along the eastern section of the ditch. The width of the wall is 60 cm and height is 50 cm. Four courses of stones are visible in the ditch section. The length of the wall cannot be es-

timated because of its partial destruction by the ditch and the rest being buried under unexcavated deposit. Another small wall was located 2.5 m from the eastern end of the wall of STR 39. This wall is 1.10 m long and runs NS. At its eastern end it is joined to a longer EW running wall which has survived to a length of 3.25 m, a width of 60 cm and a height of 35 cm. The two long walls and the small wall from a small chamber which has a length of 1.45 m and a width of 1.10 m. This chamber is again enclosed by a small wall having three courses of mud-bricks. It has a length of 1.0 m, width of 40 cm and height of 30 cm. On the southern side of the structure a small portion of the wall, which is badly damaged, was exposed. It partly cuts through the mud-brick wall of Structure 40 and has survived to a length of 40 cm. Structures 39 and 40 are separated by a gap of 25 cm. The remaining part of the wall suggests that several courses of stones existed of which only two have survived.

Close to the southern side of STR 39, there is a structural-complex of earlier phase. STR 40 is badly damaged by a water channel which was dug recently. The wall of the structure runs in a S W-NE direction which survived to a length of 2.80 m and a width of 60 cm. This wall is made of mud-bricks and brickbats. The height of the exposed wall is 56 cm at its southwestern comer. This wall is disturbed again at its eastern end by the wall of STR 39 which is of a later period. Underneath the mud-brick wall, a stone plinth is visible. The stones are of smaller size (25 X 12 cm, 15 X 6 cm and 14 X 8 cm) and are neatly arranged. On the southern side of the wall a floor was exposed. This floor has evidence of burning activity in several places. It is rammed with pieces of brickbats. The size of the bricks is 27 X 14 X 10 cm.

Excavation undertaken in the northern periphery of the mound in Trenches. Q13, Q14, R13 and R14 (in Nathu Krishna's field) with a view to tracing northward extension of the Chalcolithic occupation and ascertaining the extension of the partial walls which were thought to be a part of the outer fortification wall of the settlement. The finds comprising stone, mud-brick and mud structures, well-rammed mud floors, fire-places, pottery and other items of material culture represent both phases A and B of the Chalcolithic culture.

Four structures, namely Nos. 45,45A, 45B and 46, were excavated in this area. The nature of construction was similar to that seen in other parts of the site, except that the walls were narrower. However, the rooms were quite spacious, atleast 4.50 m X 3.50 m in size. This area has proved to be very rich in respect of material remains. A complete copper bangle, a piece of copper knife, a clay bull figurine, five toy-cart wheels, a dish-on-stand in grey ware and a full pot placed next to a fire place in layer 9 in R13 (SE) were the main finds.

The fire-place with a diameter of 80 cm and consisting of compact circular floor, was covered with ash and charcoal and contained large quantity of charred barely grains, some charred animal bones, a hammer-stone, two toy-cart wheels, a perfectly circular large stone ball and some potsherds. It was located inside a partially excavated room. Close to the fire-place, a large grey ware storage-jar was found. The jar, filled with mud, contained six carefully packed small vessels five of them fully intact and one slightly damaged. Three of the vessels were wide-mouthed, slightly carinated black-and-red ware bowls with beautiful geometric paintings comprising wavy lines and dots in white on the inner surface. The fourth vessel is a narrow-mouthed convex-sided

black-and-red ware small pot and the fifth one is a slightly convex-sided S-shaped pot with very narrow mouth in grey ware. This pot contained a large quantity of steatite disc beads and coix flowers. Many of these beads and flowers are still embedded in earth sticking to a side of the pot. Clearly, the pot was a lady's jewel box. The sixth vessel is a small grey ware globular pot of coarse clay and poorly baked. The pots belong to phase B. This set of complete seven pots is a unique find at any Chalcolithic site in India. This quadrant has also produced a large number of sherds having reserved slip decoration.

In layer 11 in the section facing east in Trench R13 (SE) a well laid mud-brick wall with five courses of bricks was seen. The bricks are well proportioned and are arranged in header and stretcher fashion. The underlying layers 12-14, with a deposit of 1.50 m, represent the later part of phase A of the Chalcolithic occupation.

Digging in the early historic deposit was carried out only in Trenches E4, D4, C4 and B4 inside the fortified enclosure. The stratigraphy is identical to that noticed in other areas. The only worthwhile evidence of structural activity was a stone-paved platform found in Trench D3. It seems to extend into Trenches E3 and D5. It has an extant maximum length of 3.60 m and a thickness of 60 cm. Layer 3 seals the platform. In layer 2 in D4, a hearth, measuring 60 cm in diameter, made of three stones, was found. It contains a lot of ash, some potsherds and bone fragments. As in previous years, the early historic deposit yielded terracotta figurines of animals, like cattle and dog, the bull figurines being more abundant. Other antiquities include beads of terracotta, particularly of arecanut shape, semiprecious stones, steatite and glass, bangles of terracotta, glass and shell, terracotta weights, lamps, wheels and discs and plentiful iron objects. Layer 3, as in previous years, was the richest in antiquities. The layer also contained evidence of burning.

TAMIL NADU

60. EXCAVATION AT MALIGAIMEDU, DISTRICT CUDDALORE

The State Department of Archaeology, under the direction of A. Abdul Majeed, assisted by N. Marxia Gandhi, S. Vasanthi, S. Krishnamurthy, G. Arjunan and S. Sreekumar carried out excavation at Maligaimedu (11° 48' 3N; 79° 34' 57E) in Panrutti taluk of District Cuddalore. It is a village situated about 22 km from Villupuram. Total four Trenches MGM1, MGM2, MGM3 and MGM-4 were laid which revealed three cultural periods.

Period I from layer 6 to 8 (2.45 m to 4.30 m) revealed black-and red-ware, red ware, black ware, black-rouletted and coarse red ware (300 BC-AD 500). Two inscribed pottery, copper coin with Ujjain symbol (obverse) and a humped bull (reverse) were found. It is observed that this might be the coin issued by the Satavahana king who had their sway in this region. Other important finds are the sherds of NBPW, a copper anklet round in shape. Another noteworthy find from layer 6 is a silk thread strand. The Period II (fourth-twelfth century AD) yielded terracotta beads, spindle whorls, iron nails, glass beads besides sherds of red-slipped ware, black-and-red-ware, black ware and Russet coated ware.

In Period HI coarse red ware, red ware, a few red-slipped and immitated Rouletted sherds, a red ware sherd with graffiti showing peacock, were was also found along with a terracotta cuboid dice. The number of dots that noticed on the flat rolling faces are one, three, four and five. The

length breadth and thickness of the dice is 3.25 x 1.6 X 1.5 cm. The terracotta earlobes, beads, smoking pipes, spindle whorls were also collected from the excavation. Among other important finds, a square copper coin with figure of an elephant and auspicious symbols deserve mention here.

Lime flooring (3.80 X 1.90 X 19.7 cm) exposed in MGM-I was found paved with small brickbats mixed with lime-mortar. A post-hole was also found in the northeastern side of the lime floor, the diameter of the post-hole is 13 cm and the depth inside is 7 cm.

A brick (45 X 20 x 7 cm) structure was also found in Trench MGM-3. The length of the structure is 3 m while the thickness is 50 cm. It was the first phase of construction in which the structure runs from north-to-south with a length of 3.93 m and the length towards east-to-west is 2.40 m.

A remarkable discovery of a structure (4.05 m) in MGM-4 shows seven courses of bricks with the size 60 X 25 X 5 cm. The structure, found at a depth of 1.50m in layer 3, belongs to Period III. Near the structure four terracotta ring-wells were found with three rings laid one below the other. The size of the ring-well is 65 cm. The ring-wells were cut across layer 6 at a depth of 2.80 m. The ring-wells one above the other were held firmly by laying the potteries, brickbats and sand around them. The other two ring-wells were also found nearby. The exposure of these ring-wells and the structure revealed that this place was once a habitation site. It is ascertained from the findings that this site was inhabited from the third century BC.

61. EXCAVATION AT SHORE TEMPLE-COMPLEX, MAMALLAPURAM DISTRICT KANCHIPURAM

In continuation of the last season's work *(1998-99,* pp. 155-156). the Chennai Circle of the Survey, under the direction of K.T. Narasimhan, assisted by Satyabhama Badhreenath, G. Thirumoorthy and K.P. Mohandas, R. Jayaraj, R. Vinayagam and J. Kuppusamy carried out excavation and simultaneous conservation of the excavated structures in the temple-complex.

The trenches were laid further north and east of the recently exposed laterite wall to ascertain the extent of the laterite wall. Also, to study the extent and nature of the stepped-structure, trenches were laid to the north of the already exposed stepped-structure. The excavation revealed an abrupt end of the laterite wall. It is 'L' shaped with long arm in north-south and smaller arm in east-west orientation. The stepped-structure could not be traced further north, i.e., beyond the laterite wall. Moreover, the stepped-structure on the extreme north is found with laterite core alone. It is not cased with granite stone-slabs both vertically and horizontally as in the case of stepped-structure to the south of laterite wall. Also, the stepped-structure is damaged at many places. Further, the excavation brought to light base of massive brick platform (already exposed). During the removal of the baulks, a few stone boulders were encountered. Also three more brick chunks (5.60 X 1.45 m; 4.80 X 1.10 m; 2.70 X 0.85 m) were exposed while section trimming. Part of the chunks still remain in section on east and south eastern corner and hence the exact nature of these brick chunks could not be studied.

The excavation also revealed the extent and the exact nature of the base of the brick platform. This base found at a depth of 2.80 m is rectangular and measures 11.30 X 4.85 m. The rectangular stone-slabs as outer veneer is used on the south, east and northern sides. One of the largest and well-dressed stone-slabs on the eastern side measured

2.40 X 0.55 X 0.08 m. Above these stone-slabs, a brick wall with five courses are seen at regular intervals. The area within these stone-slab walls was found to have been embedded with rough stone-slabs and brickbats over a base of thick clay.

The existing laterite wall measured a length of 8.20 m on eastern and 2.90 m on southern sides. The thickness of the wall is 1.45 m with a height of 1.60 m. The laterite is raised over a foundation of six courses of brick. The laterite block used in this construction are well-dressed and measures 40 X 25 X 35 cm (average). While for veneering the dressed-blocks are used the core, packed with stone rubbles. The surface must have been applied with lime-paste as is seen in patches at present. The distance between the laterite wall and the fifth step is 1.50 m.

The brick platform broken and scattered around into seven chunks, consists of twelve courses of bricks with large use of lime-mortar. The biggest chunk measures 5.35 X 3.80 X 1.10 m lying over the second step and only displaced by about 10cm. The top surface of this large chunk is divided into compartments and is applied with lime-paste. This platform could have served as a jetty point (?) which needs further probing to evaluate the existing results. Parallel to this on the eastern side, a few brick courses unearthed over a well-dressed granite slab, serve as cushion to the brick wall. At the bottom a pure clay pasting over the ground is also noticed. These finds can push back the architectural activity at Mamallapuram to early Christian era, if not earlier.

The conservation work was taken up simultaneously to protect the exposed structures from deterioration. The biggest brick chunk was challenging as it was overhanging at a height of 1.85 m. It was consolidated by supporting it with granite blocks and R.C.C. masonry, after careful removal of earth accumulated beneath it. The other chunks were conserved suitably and provided with apron, etc. The laterite wall was provided with sunken pointing with the use of hand ground lime-mortar and the same was watertightened.

No significant pottery or antiquity could be noticed but the occurrence of meager quantity of sherds of red ware assignable to early medieval period and also a fine hopscotch with a diameter of 4 cm deserve mention.

62. Excavation at Theriruveli District Ramanathapuram

The Department of Archaeology, Government of Tamil Nadu, conducted excavation at Theriruveli, 20 km east of Mudukulathur and 35 km west of Ramanathapuram town in Mudukulathur taluk, under A. Abdul Majeed, with the assistance of N. Marxia Gandhi, R. Selvaraj, S. Santhalingam and C. Chandravanan.

During the systematic excavation seven trenches, measuring 5 X 4 m were laid in order to expose the cultural habitation of this region at a site called 'Colony Thidal' of that village. .

The excavation revealed sherds of NBPW, coarse-red ware, black ware, black-and-red ware, grey ware, Rouletted ware, russet-coated ware, sherds with graffiti symbols offish. Besides this, six inscribed sherds with Brahmi script were also recovered. It is interesting to note that the personal names Korran, Sattan, and Nedukilli appear on the sherds. Objects like lids, hopscotch, spout, terracotta ring-stand, iron pieces, terracotta lamp, shell bangles, sawed conches, carnelian beads etc. were also recovered.

63. Excavation at Kortallayar Basin, Attrambakkam, District Tiruvallur

Shanti Pappu, under the co-direction of N.C. Ghosh resumed excavation at Attirambakkam.

A 5 x 5 trench was laid down at the top of the mound (Trench T6). This was divided into five quadrants of 1 X 1 m each and labeled alphanumerically. The trench was later extended by 2 X 2 m in the south-west corner in order to trace the continuation of animal footprints. Sterile deposits were removed. Within the ferricretized gravel deposits of layers (2 and 5), excavation was conducted in 10 to 20 cm digs. Deposits from selected quadrants were sieved. Within the extended trench area comprising F and G, all material was sieved and three dimensional measurements of artefacts were taken in addition to the orientation and inclination of each artefact and natural clast. A total sample of more than twelve thousand five hundred artefacts were collected, ranging in age from the Acheulian to the mesolithic. These include finished tools, cores and debitage. Artefacts are currently under study.

Lithostratigraphy of Trench T6

Layer	***Depth***	***Nature of remains***
Top soil		Microliths
Sandy-clay with dense concentration of calcrete nodules	0 to 1.15 m	Sterile
Ferricrete	1.15 *to* 1.80m	Upper Palaeolithic
Calcareous sandy clay	1.80 to 2 m	Sterile
Ferricrete	2.0 to 3.00 m (variable: sloping surface. Maximum thickness of 1 m)	Middle Palaeolithic Acheulian (on surface of clay)
Laminated clay	3.00 to 7.30 m	Acheulian

The important findings of this season are:

Artefacts comprising blades, and blade cores among others were obtained from a ferricrete horizon at a depth of 1.15 to 1.80 m. These do not correspond in typology to Middle Palaeolithic artefacts or microliths and could be possibly assigned to the Upper Palaeolithic. This is the first identification of the Upper Palaeolithic phase in Tamil Nadu.

The contact horizon of the ferricrete (layer 5) and clay (layer 6) was the occupation horizon for Acheulian hominids.

A total of fifteen footprints were noted in the main trench (Qds A to E) and a total of five

possible bovid hoof impressions. On extending the trench in the south-west direction (Qds E and F), a total of three more footprints (two round and one bovid) were noted. All were at a depth of around 3 m. This discovery is important for the following reasons:

a. Animal footprints in association with Acheulian artefacts appear for the first time in the sub-continent;
b. Suitable evidence for palaeoenvironmental studies;
c. Establishes conclusively the primary nature of the site.

The continuation of Acheulian artefacts within the clay (layer 6) posed a problem, owing to the fact that they were assigned a lower Cretaceous age. To explain the presence of artefacts in an older clay deposit would invoke either the question of artefacts sinking within the deposit through cracks or successive burial of tools over a long time.

An anvil was noted at a depth of 3 m in Qd G2, in association with hammerstones and debitage. This rests on the surface of the clay horizon (layer 6). A possible alignment of large cobbles and pebbles was noted in association with this and is under study.

The discovery of animal footprints in association with Acheulian artefact and the discovery of the clay surface being the Acheulian horizon, render the site at par with other Acheulian sites in East Africa with immense potential for detailed study.

64. EXCAVATION AT TIRUVERKADU, DISTRICT TIRUVALLUR

The Department of Ancient History and Archaeology, University of Madras, Chennai, continued excavation at Tiruverkadu in Sriperumbudur Taluk, under the direction of P. Shanmugam, assisted by R. Ponnusamy, M. Seran and P.D. Balaji.

Two Trenches, TVD-6 and TVD-7, measuring 8m x 5m and 12m X 4m respectively were laid to the east of the Iyappa Samigal Mutt and to the south of TVD-5, excavated in the last season. During the course of excavation cultural deposit to a thickness of 2.6 m with nine layers were noticed in TVD-6. In the adjacent Trench TVD-7, seven layers were identified in a total deposit of 2.9 m.

Tentatively the cultural deposit was divided into three cultural periods. The Period I was subdivided into Period I-A (Iron Age phase : 400 BC-AD 200) and I-B (post-Iron Age phase : AD 200 - 600), Period II represents the early medieval period (AD 600 - 1200), Period III was late medieval period (AD 1200 onwards).

Period I-A was characterized by the presence of black-and-red ware, black ware sherds and coarse red ware with painted designs. They are well fired with a thick core. Both the trenches yielded antiquities like hopscotches and pieces of terracotta lamps and knobs. A small amount of iron slags were also collected, suggesting thereby the existence of an iron furnace or iron working in this locality. In the corresponding level at TVD-6, a broken part of a well-finished celt, probably a survival of neolithic period was traced.

In Period I-B, finer variety of black-and-red ware sherds and a few black ware sherds were collected. Two floor levels were noticed in TVD-6 at a depth of 1.53 m and 1.42 m. They were laid with lime and clay. Three post-holes associated with the floor level were also identified. By the

side of these floors, a ring-well with seventeen rings of terracotta were exposed at a depth of 1.49 m. The diameter of each ring was .90 m, its height was .15m and thickness was .02 m. The working pit having a diameter of 1.60 m was also demarcated and it contained loose deposit mixed with black-and-red ware sherds.

Period II witnessed some structural activity as endorsed by the exposition of a number of structures in both the trenches. Red-slipped ware and coarse red ware pieces were found. Pieces of conical jar and roof tiles were also found in this level. Among the antiquities, fragmentary bangles, iron pieces and a small votive lamp were collected. This period was not well represented.

The Period III was characterized by the presence of coarse red ware. In this level a copper-ring and a few iron slags and nails were collected. A brick structure in north-south orientation running to 3 m with a width of .36 m was exposed at a depth of .55 m in TVD-6. It consisted of eight courses of bricks. Another structure with five courses of bricks was found at a depth of .40 m in TVD-7. Clay was used as binding material. No traces of plastering was visible. In the same level remains of roof material were found *insitu.* The structure could be identified as front porch of a small house. A small granite slab was provided as a door-step at the entrance of the porch. The door frame or other remains could not be noticed. These structural remains indicate the existence of dwelling, which was subsequently deserted. Among the important antiquities, brass-ring, iron nail and terracotta objects such as lamp, smoking pipe and a small icon of Ganesa are noteworthy.

65. EXPLORATION IN DISTRICT VELLORE

K.P. Mohandas, of the Chennai Circle, of the Survey, noticed the following cultural remains during village-to-village survey for antiquarian remains in Arakkonam taluk.

Village/Site	***Nature of remains***
Anaikattaputtur (13°03'N;79°47'E)	Siva temple of late Chola period
Anantapuram (13°01'N;79°45'E)	Middle Palaeolithic Stone tools Siva
Kolattur (12°56'N;79°38'E)	temple of late Chola period Siva
Melvenbakkam (I2°55'N;79°37'E)	temple of Vijayanagara period
Palur (12°58'N;79°40'E)	Three Buddha sculptures of late medieval period
Panapakkam (12°55'N;79°34'E)	Vishnu temple of Chola period

Village/Site	*Nature of remains*
Padukesavaram (13°00'N;79°45'E)	Siva temple of late Chola period
Tandalam (12°55'N;79°36'E)	Siva temple of late Chola period
Uriyur (13°03'N;79°46'E)	Tamil inscription on a stone slab of Vijayanagara period

66. EXPLORATION IN DISTRICT VILLUPURAM

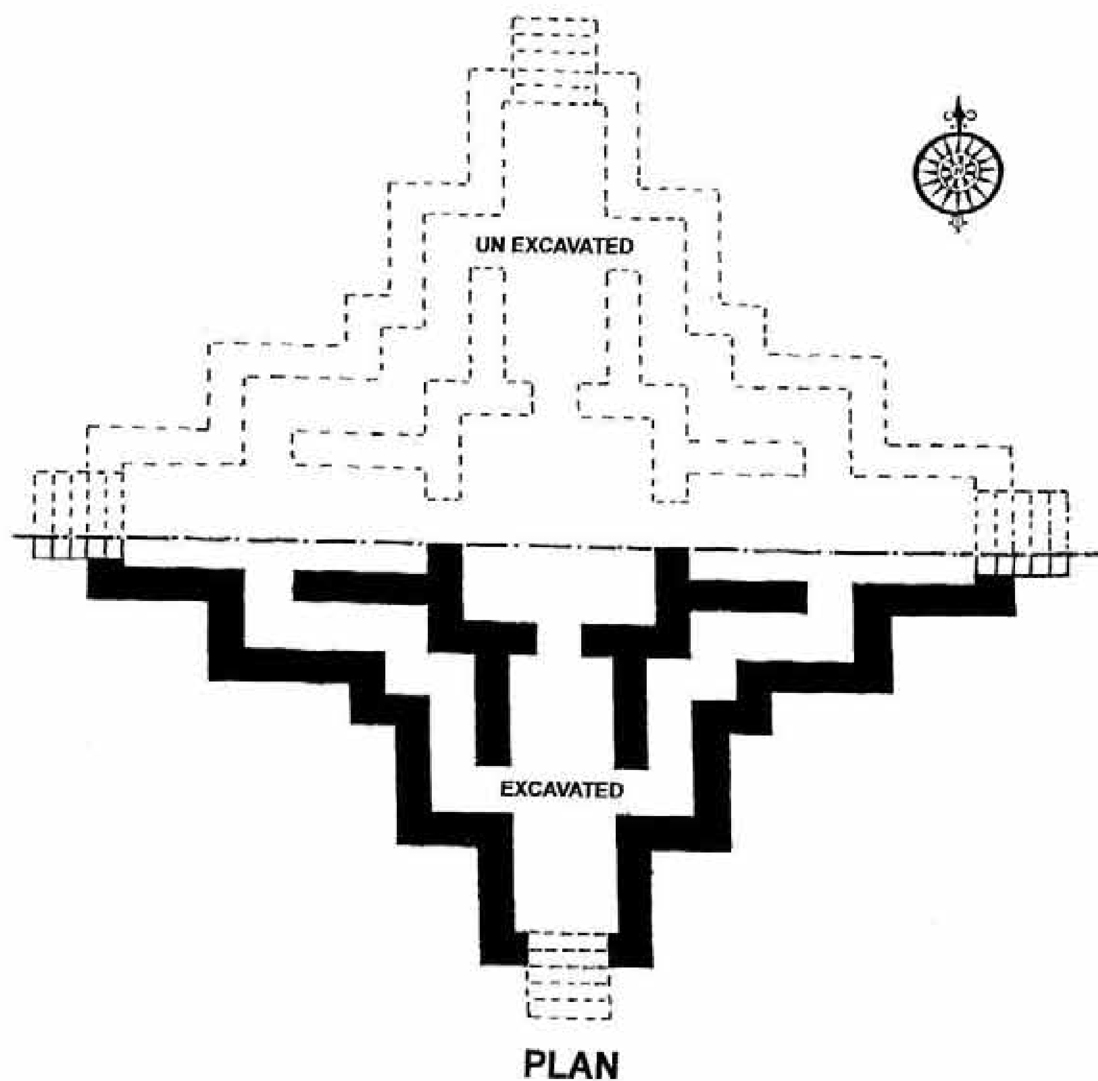
M.Nambirajan, of the Chennai Circle, of the Survey, noticed the following cultural remains during the village-to-village survey in Gingee taluk.

Village/Site	*Nature of remains*
Annamangalam (12°20'N;79°23'E)	Siva temple of late Chola period, loose sculpture, architectural pieces, Hanuman in bas relief
Gengapuram (12°22'N;79°24'E)	Neolithic celts, black-and-red ware, sarcophagus, a temple of late Chola period
Kariamangalam (12° 18'N;79°26'E)	Tamil inscriptions of Chola period, Vishnu temple and hero-stones of late medieval period
Mahadevi Mangalam (12° 17'N;79°24'E)	*Sapta-matrika* panel, loose sculptures of Ganesa and Durga, a hero-stone
Neranur (12° 17'N;79°27'E)	Two Amman temples, Tamil inscription of late medieval period
Perumpugai (12° 15'N;79°27'E)	Jaina temple of Mallinatha of early Vijayanagara period
Samanthakuppam (12°21'N;79°24'E)	Neolithic/megalithic site, fragment of Sarcophagus
Sandisakshi (12° 19'N;79°24'E)	Ganesa temple of medieval period and Tamil inscription of late medieval period
Sattanandai (12°20'N;79°27'E)	Two Tamil inscriptions of late medieval period
Uranithangal (12° 15'N;79°27'E)	Jaina rock-shelter with eighteen beds and an inscription



SHYAM SUNDAR TILLA
SOUTH JOLAIBARI, SOUTH TRIPURA

5 0 5 METRES



PLAN

TRIPURA

67. EXCAVATION AT SHYAM SUNDAR TILLA, DISTRICT SOUTH TRIPURA

G.C. Chauley and K. Lourdusamy, assisted by B.Sinha, C. Kumaran, A.K. Gupta, J.Das and D.K. Mazumdar of the Guwahati Circle, of the Survey, resumed *(1998-99,* pp. 159-161) excavation at Shyam Sundar Tilla. During this season, southern half of the brick-built terraced stupa was exposed of which upper portion is badly disturbed. Architecturally, the stupa is built on cruciform plan in *pancharatha* order (fig. 11). The basement of the brick-built stupa is punctured by entrances, measuring 4.70 m wide runs in cardinal directions, of them the southern one is fully exposed; the eastern and western entrances are partially exposed. An outer *pradakshina-patha* of rammed floor round the basement is observed in exposed areas. The outer walls of the basement are decorated with friezes of terracotta sculptures comprising various divinities including human figurines, scenes of contemporary socio-cultural activities, figures of animals, birds, flowers etc. The sculptural panels contain figures of *Kirttimukhas,* dancing human figures of both male and female, archers, warriors, peacocks, buffalo, lion, deer, seated figure of Buddha, flying *gandharvas,* musicians etc.

The superstructure above the basement is damaged. However, evidences suggest that the superstructure is built of similar plan in conformity with that of the basement but in receeding *rathas.* An intervening, inner *pradakshina-patha* 1.75 m wide is observed in the exposed areas. The entrances in the cardinal directions, in exposed areas, observed to lead to the central parts of the stupa, the details of which are yet to be exposed.

Excavation in this season brought to notice a number of antiquities, mainly terracottas comprising human figurines, figurines, figures of lion, elephant head, pig, tortoise, *makara,* fish, rhino, swan seated Buddha figures etc. Stylistically the stupa can be dated to the ninth-tenth century.

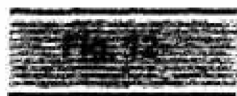
68. EXCAVATION AT THAKIURANI TILL.A, DISTRICT SOUTH TRIPIURA

G.C. Chauley and K. Lourdusamy, assisted by B. Sinha, C. Kumaran, J. Das and P.K. Mazumdar, of the Guwahati Circle, of the Survey, resumed *(1998-99,* p. 161) excavation at Thakurani Tilla.

Excavation in this season is concentrated on the southeastern portion of the mound (fig. 12) and exposed ruins of four small temples which survived upto the plinth levels. The temple, (STR-1) to the extreme southeastern side is a square sanctum cella, exteriorly measuring (7.5 X 7.5 m) with 80 cm thickness. It has twelve extant brick courses survived upto a height of 65 cm. There is a central brick platform measuring (3.20 X 3.20 m), survived with three extant courses of brick upto 18 cm in height, with an intervening *pradakshina-patha* of 1.35 m wide around the central platform. Various sizes of bricks were used ranging from (28 X 22 X 8 cm), (33 X 24 X5 cm), (19 X 14 X 5 cm) and (23 X 19 X 7 cm).

Another sanctum cella (STR-II) lies slightly north-west corner of the structure (STR-1). The remains of this brick-built temple smaller in size is also square on plan, measures (5.6 X 5.6 m) and survived with six extant courses of bricks. Thickness of the wall is 80cm and its height is 45cm.

Remains of another structure (STR III) is also a square sanctum cella measuring (6 X 6 m)



THAKURANI TILLA, PILLAK, SOUTH TRIPURA

0 5 10 15 Metres

ENTRANCE

STR 3

STR 2

STR 4

STR 1

ENTRANCE

TO PILLAK

TO UDAIPUR

PLAN

on plan with a central square platform (1.6 X 1.6 m) which bears a circular *pitha* of 1.20 m diameter fitted with a square socket of (33 X 33 cm) in size. The temple opens on the southern side. Sizes of the bricks range from (31 X 25 X 6 cm), (29 X 17 X 4 cm) and (25 X 19 X 4 cm).

Fourth structure (STR-IV) is also another brick-built sanctum cella but rectangular on plan. It measures (6.80 X 6.20 m) externally and walls all around having an width of 70 cm. A central platform within it measures (2.80 X 3.40 m) with an extant eleven courses of bricks. The sizes of the bricks are ranging from (30 X 22 X 5 cm), (27 X 19X 4 cm) and (20 X 19 X 4 cm) etc.

Limited antiquities from the excavation comprise fragments of iron and copper artefacts. Ceramic assemblages are red wares with a few sherds of red-slipped wares and buff wares. The shapes are miniature pots, bowls, vase, etc. On stylistic consideration, the temple ruins are dated to *circa* ninth-tenth century.

UTTAR PRADESH

69. EXCAVATION AT BIRCHHABILI TILA, SIKRI, DISTRICT AGRA

Under the direction of D.V. Sharma, assisted by V.N. Prabhakar, A.K. Bhargava, Arakhita Pradhan, K.A. Kabui, R.S. Mulimani, R.K. Tewari, Chiranji Lai and Lochan Singh, of the Agra Circle, of the Survey, the excavation at Birchhabili-Tila (27° 06' 05" N; 77° 40' 07"E) was taken up (fig. 13). The site is in the village Sikri in Kiraoli tehsil contains remains of temple sites where architectural members, sculptures and ancient relics were found scattered in large number. Sculptures discovered during exploration, suggested the existence of Vaishnava, Saiva, Sakta and Jaina temples at the Sikri during the ninth-eleventh centuries. Before carrying out horizontal excavation at site, the area within a radius of 25 km in and around Fatehpur Sikri was scientifically explored to ascertain settlement pattern, topography, water management system and archaeological remains. The villages such as Chauma Shahpur, Imlaoda, Chichana, Churiyari, Jainpura, Jotana, Dura, Kagarol and Kiraoli were systematically explored. These villages yielded architectural remains of temples, sculptures and other antiquities datable between the second and eleventh centuries AD. The settlement pattern of this region also indicated the existence of Vaishnava, Saiva, Sakta and Jaina temples during the period. Due to its location on the bank of the lake mentioned as 'Moti Jheel and 'Dabar Jheel in Jaina literature and existence of architectural remains *in situ* the Birchhabili-Tila was scientifically excavated to ascertain the results of exploration and earlier excavation (pl. 120). A few Jaina sculptures and architectural members were discovered in addition to the *adhishthana* of a temple, partly exposed at its southern portion along with walls constructed of random rubble masonry. The site was later deserted as it was being used as a graveyard.

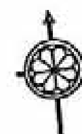
In a total area of 2000 sq m 44 quadrants were undertaken for excavation of which six were dug upto the natural soil with the following cultural sequence in a deposit of 6.5 m.

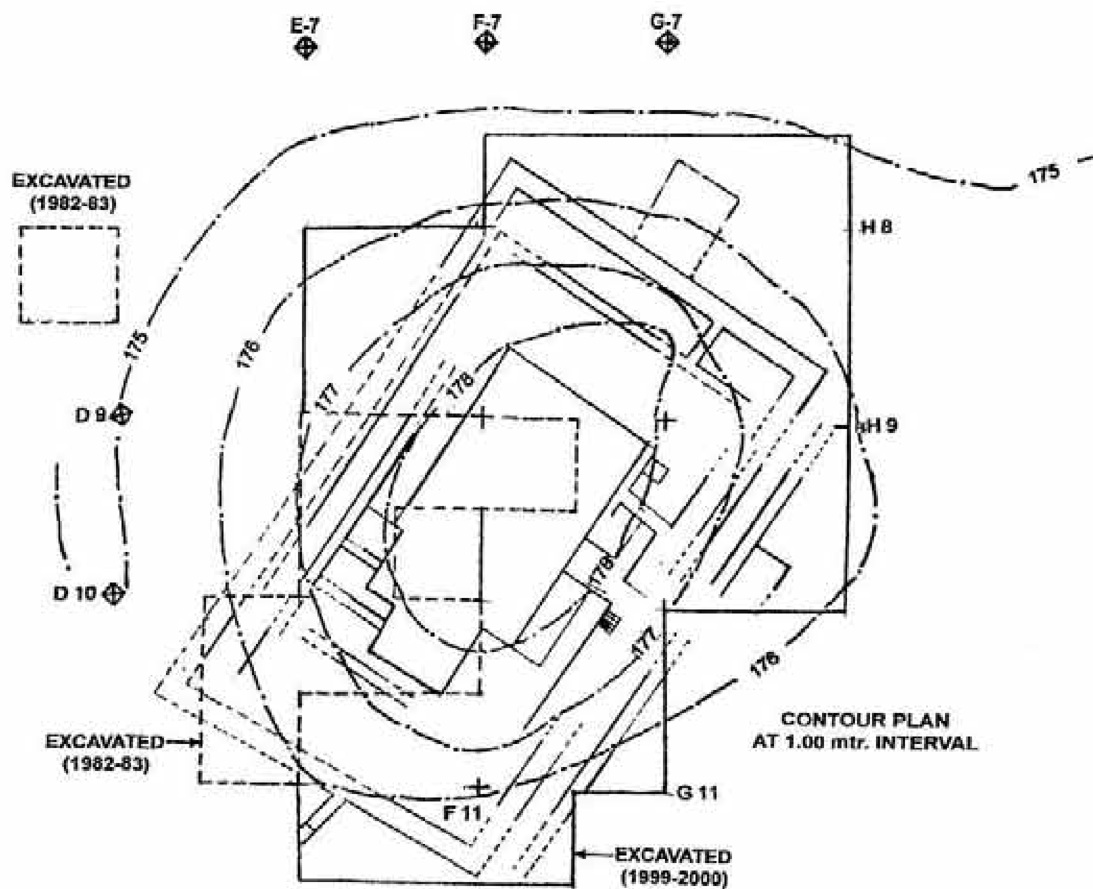
Period I - *circa* sixth-eighth century AD Period II - *circa* ninth-twelfth century AD Period III - *circa* twelfth-sixteenth century AD Period FV - *circa* sixteenth-eighteenth century AD

The periodisation/classification of cultural deposits was determined on the basis of finds, dated inscriptions, pottery types, coins, structures,

SITE PLAN OF BIRCHHABILI TILA
FATEHPUR SIKRI, AGRA
(1999-2000)

5 0 5 METERS





Plates 120-121



120



121

Birchhabili Tila, Sikri Village: 120, *general view and* 121, *image of Ambika*

antiquities and other associated material unearthed during excavation. The co-relation of structures of different phases/period was done to study house plan, orientation and their probable use. Accordingly, different structural phases were identified on the basis of stratigraphy and material culture.

The cultural deposits of Period 1 revealed in Trenches G-9. E-8 F-8, and F-9 show structures made of random rubble masonry and mud-bricks measuring 30 X 1 5 X 4 cm. Two mud-brick walls visible in sections facing north and south of G-9 were unearthed below random rubble masonry structures of Period-II. These mud-brick walls, measure 1 . 1 5 m in length, run in east-west direction parallel to each other. The distance between these two walls is three meters. In-between these walls, another wall of random rubble masonry/ brickbats was exposed in the same orientation. Besides this, a burnt-brick wall (measuring 40 X 35 cm), having four courses, was also exposed near northern mud-brick wall. The size of the bricks is 31 X 16 X 5cm. The complete plan of structures in this period could not be ascertained due to limited working space in the trench.

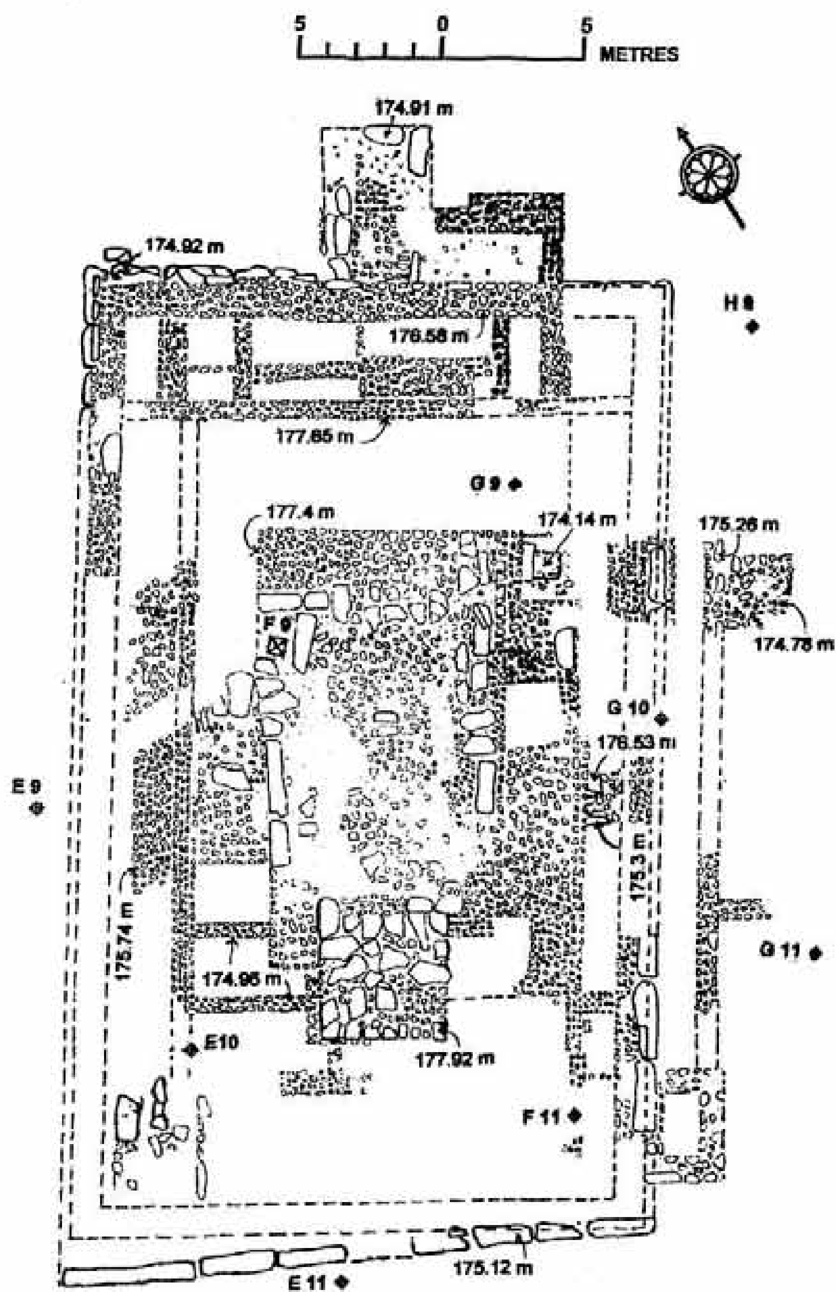
Two structural phases of Period I were identified in F-8. The structure in early phase comprises two rooms. The large one measuring 3.05 X 2.26 m. and the smaller 2.3 X 1.8 m with the thickness of walls ranging from 45 cm to 50 cm. The complete plan of this structure could not be exposed because it runs below structure of Period II. In this phase, one dressed-red sandstone pillar was found lying on the floor level to the east of above-mentioned structure. The pillar measuring 1.72 X 0.29 X 0.23 m (I X b X t) in dimensions is plain and lies in a north-south direction. The area west of two-roomed structure was excavated upto the natural soil at the depth of 4.04 m. The structure of late phase in Period-I comprised one room measuring 2.68 X 0.7 m with 0.54 m width walls. The walls have random rubble masonry foundation and burnt-bricks were used for superstructure. Two courses of burnt-bricks (31 X 1 6 X 5 cm) were exposed. A hearth with brickbat lining was excavated towards the west of above-mentioned room. The dimension of the hearth is 45 X 25 em and ash was found *in situ.*

Another mud-brick wall running in east-west direction was also exposed in E 10. The length of this wall is 1.4 m and width 0.4 m.

In F-9. habitational deposit of Period-I was excavated below the man-made pit of red sandstone slabs. An area measuring 95 x 65 cm was excavated upto a depth of 5.92 m near the pit but natural soil could not be reached. The excavation in this area revealed successive floor levels with a thin habitational deposit on each level. The thickness of floors ranges between 2 cm and 7 cm. A rectangular trough of mud was exposed in the section facing south resting on a floor level at a depth of 5.95 m. The colour of the floor was pinkish. An earthen vase partly buried under the floor was found at this level. A thick deposition of ash was found south of this vase. The floor is made of lime, mixed with *kankar* and mud nodules.

In E-8, structures of two phases of Period-I were found running underneath the outer enclosure wall of Period-II. A mud deposit of 65 cm thickness was found below the enclosure wall of the temple of Period-II. This indicated that the temple of Period-II was constructed over the habitational deposit of Period-I after levelling the ground properly. The structure of early phase consists of two rooms, walls whereof were found partly continuing the sections. The structure of the

TEMPLE PLAN, BIRCHHABILI TILA, FATEHPUR SIKRI



late phase of Period-I runs in north-south direction. The wall is made of random rubble masonry with a length of 2.55 m and thickness of 60 cm.

Two stonewalls running in east-west and north-south directions in Qd III of F-9, probably a room, were found below the foundation of the temple of Period-II. One meter habitational deposit was found in this trench below the foundation of temple of Period-II. These walls are constructed of random rubble masonry. The length of wall, running east-west, is 1.45 m, while its width is 0.9 m. The length of wall running north-south is 0.85 m while its width is 0.40 m.

The occurrence of above-mentioned structural remains and cultural deposits are datable between *circa* sixth and eighth century AD. The structure exposed in E-8, F-8, F-9 and G-9 are contemporary and belong to Period-I while structures found in G-9 and F-9 are part of one structural-complex.

The pottery from Period-I is plain red ware and black ware. Some sherds of red ware bear nail impressions or applique decorations. Mica dust is used on this pottery for decoration. A few sherds of red ware were treated with slip in golden colour with a black band. The main shapes of pottery are vases, bowls, basins, dishes, miniature pots, *lotas,* storage-jars, knobbed-lid, etc. Adequately fired sherds of red ware with fine texture were found with stamped decoration. An interesting potsherd displaying a horse figure in motion executed in low relief was also found.

The discovery of a broken sculpture of Ambika in red sandstone, datable to *circa* sixth-seventh century AD is of immense archaeological importance (pl. 121). The depiction of ornaments and drapery is comparatively simple and in low relief. This suggests the existence of a Jaina shrine at Sikri during the late Gupta period. Similar type of sculpture of Ambika was discovered from Kankali Tila, Mathura. The discovery of Ambika sculpture, red sandstone pillar and a two-letter Brahmi inscription on a piece of stone suggest the existence of a Jaina shrine at the site during this period. The other noteworthy antiquities of this period are terracotta beads, tablets, moulds, sling-balls, gamesmen, hopscotch, glass beads, glass and iron bangles, chisel and spearhead.

Period II is represented by the remains of a Jaina temple (fig. 14), sculptures, antiquities and other archaeological finds. The entire area was properly levelled and rammed before construction of a shrine over it. The area on the southwestern side of the mound indicates that rectangular stone walls were constructed parallel to each other by providing cells like chamber below the platform. Similar type of structures were traced in some area exposed in southeastern portion of the mound. The walls of these cell-like structures run parallel to temple platform and perhaps were filled with earth to make the ground firm and stable to bear the load of massive superstructure. The evidence of such type of cells was not found in the north-east and the north-west portions of the mound.

The platform (base of *adhishthanq)* of the temple, constructed of massive undressed stone blocks of sandstone regularly placed on each other towards the north-east to south-west direction measures 18 m in length and 4.5 m at the rear and 9 m in front sides. This undressed sandstone blocks locally available around Sikri were arranged for construction according to the available size and shape. On the south, platform height is 2.8 m, east 2.58 m, west 2.8 m and north 2.71 m, above the

foundation. The temple platform measures 4.5 m on south and 9 m on north. The length of the temple platform is 18 m. The southern portion of the temple platform is slightly projected thus reducing its width from 9 m to 4.5 m. The platform is further covered with flat and massive sandstone blocks to provide smooth surface for the superstructure. The average size of these stone blocks is 2 m X 0.5 m X 0.2 m (1 X b X t). In later period a large number of such slabs from the platform were found disturbed, and also reused at the site. The excavation revealed projections in east-west directions to provide space for steps to approach the shrine from lower platform. The northern projection on the eastern side has a flight of steps. Another flight of steps was discovered on the southern projection. A broken head of Parsvanatha sculpture was discovered near the lower step of this projection. The discovery of moulded and carved sandstone architectural parts from the site indicates the temple form. Also found were the remains of *kumbha, amala,* pillar base, *beki* in large quantity and are datable between ninth-eleventh centuries AD.

A random rubble masonry wall was found running all around the *adhishthana* parallel to the respective side. The length of this wall is 23 m and width is 16 m while its thickness is 65 cm. The purpose of this wall appears to provide structural stability to the shrine and space all around the temple.

The main shrine is enclosed by a massive random rubble masonry wall constructed with mud-mortar and strengthened by well-dressed veneering stone. The average thickness of this wall is 1.8 m with the extant height 1.66 m from the base level. A solid and well-rammed ground was prepared before construction of this wall below foundation. Massive undressed stone-slabs were placed flat over rammed ground as base for superstructure. These slabs were laid uniformly all around as a protection against sub-soil water and to prevent capillary action. This technique was used because of constant stagnation of water in the lake close to the foundation. This arrangement was essential as a protection against sub-soil water and salt, the two prime enemies of structure. The well-dressed veneering stones were fixed on the exterior of wall for strength as well. Some veneering stones still have evidence of rusted iron dowels, *in situ* with grooves.

A projection measuring 5 X 3.8 m was found in the center of northern wall which probably served as an entrance to the shrine. The whole construction of this projection is similar and utmost care was taken to place massive stone-slabs before raising the superstructure. A flight of steps was also provided over this structure. A chamber adjoining this projection measuring 4.3 X 1.6 m was also discovered. The exterior wall of this chamber has veneering stones. The floor of this chamber was laid with well-rammed brickbats.

The important archaeological evidence of religious disposal of damaged/mutilated sculptures was traced here in the form of a man-made pit built of stone-slabs (one of which being an architectural member of the shrine). This pit dug by the people of Period II, measuring 11.5 X 0.72 m, was prepared purposefully for *visarjana* (religious disposal) of icons of Tirthankaras and *yakshis.* The height of the pit is 1.33 m, covered with massive stone-slabs in two levels. A red sandstone sculpture of Ambika broken in two pieces was found lying upside down in this pit. Iconographically, this image of Ambika is datable between the sixth and seventh century AD. The remaining thirty

Plates 122-123



122



123

Birchhabili Tila, Sikri Village: 122, Sruti Devi Jaina Sarasvati and 123, inscribed pedestal of the image

Plates 124-125



124



125

Birchhabili Tila, Sikri Village: 124, *red ware with applique decoration, Period I and* 125, *broken stone heads*

sculptures found in this pit include images of Sambhavanatha, Rishabhanatha, Santinatha and Kuntunatha with inscriptions on pedestals *(padapitha)* in *kayotsarga* posture. Seven Tirthankaras (without *lanchhana)* in *padmasana, yakshi* images of Prachindi and Ambika with inscription, two broken Tirthankara heads and fragments of other sculptures. Some Tirthankara images were placed in perfectly seated and upright position, many others were lying in haphazard manner. The discovery of Jaina Srutidevi Sarasvati (pl. 122), four-armed with *varada, kamala, pustaka* and *mala* in her hands, with a halo, rich ornaments and the vehicle *hamsa* is important owing to its uniqueness. It is different from the Hindu Sarasvati and its iconography has been precisely laid down in the Jaina texts of' *Vastu'* and 'Pratima'. This icon also has images of *'jinas'* on its side panels, confirming, unequivocally, that it is the image of Jaina Sarasvati. It bears an inscription dated in Vikrama Samvat 1069 (AD 1010) (pi. 123). Twenty-four *Jinas* (Tirthankaras) are consecrated with respective *'yakshas'* and *'yakshis'* with their identifying symbols, weapons and vehicles in a fairly large Jaina temple (Chaityalaya). Ten *dikpalas,* nine *grahas,* eight *pratiharas* and four *pratiharis* are installed in larger Jaina temples. Some *Sakta* icons as Kshetrapala, Manibhadra and Ghantakarna-Mahavira are used in still larger temples, perhaps as a matter of compromise and, in addition to them, Srutidevi Sarasvati is also prescribed to be worshipped in such temples.

The ceramic types from this period include sherds of red ware and black ware, with shapes such as vases of medium and large-size, jars, knife-edged bowls, dishes, basins, miniature pots, terracotta lamps, spouted vases. The applique and stamped decoration on the red ware continued in this period (pl. 124), comparatively in a limited number.

Along with pottery, a large number of Jaina Tirthankara sculptures and subsidiary deities, pieces of sculptures (pl. 125) were recovered. Jaina Tirthankara images comprise Adinatha or Rishabhanatha (pl. 126), Sambhavanatha, Kuntunatha, Santinatha, Parsvanatha. The *yakshi* images of Chandi or Prachindi, *yakshi* of Vasupujya, Ambika, *yakshi* of Neminatha, Chakreshvari, yakshi of Adinatha were also discovered. The most exquisitely ornamented and beautifully carved image of Srutidevi Jaina Sarasvati is a unique find. This image, standing in *tribhanga* posture, was fixed on a pedestal, placed against the wall (as is evident from the back portion left unfinished by the artist). The portion of foot of the sculpture is slightly damaged. The icon is placed with face downward near a wall. Large number of headless Tirthankara images, seated in *padmasana* posture was found in black, white and buff coloured stones. A fragment of an arm of a Tirthankara in marble and other sculptures such *as yonipitha,* broken bull, *yakshi* Ambika with her (husband) holding *priyankara* were also found. Some other noteworthy antiquities of this period include terracotta moulds of human face and ornamental jewellery and beads of various materials.

The habitational deposit of Period-Ill was traced in the east, south and north of the shrine. The archaeological evidence indicated that the site was deserted for sometime and was subsequently re-occupied. The original material was lavishly re-used for constructional activities by the inhabitants. The walls constructed of random rubble masonry with mud-mortar *and pucca* lime floors. The burnt-bricks measuring 21 X 16 X 5 cm were found used in the constructions. Some structures in this

Plates 126-127



126



127

Birchhabili Tila, Sikri Village 126, *image of Jaina Tirthankara and* 127, *figurines of horse*

period were found raised right over the temple remains. The concentration of constructional activities during this period was in the outer periphery wall on the east, near the boundary towards north. It is evident that residential complexes were constructed after they fell into disuse.

Two noteworthy structures in east-west orientation located on the eastern side deserve mention. One chamber having lime floor over brick pavement was exposed. The second structure appears to be a portion of room with an entrance on the north. The remains of brick-paved floor were exposed in this room. A small niche pierced on the exterior wall was also found. The complete plan of these structures could not be ascertained because of the disturbance in the remaining portion of the original mound due to cultivation and human vandalism.

Here a single-roomed structure on the southern direction was found having an entrance from the north. Dressed-stones were re-used for construction near the entrance.

The main pottery types in Period-Ill include red ware, grey ware and glazed ware with shapes like vases, bowls, dishes, storage-jars, long-necked *surahi* and spouted-vase.

The noteworthy antiquities found from Period-III are two circular copper coins, highly-corroded and unidentifiable. Iron nails, knives, arrow-head, terracotta hopscotch, gamesmen, animal figurines (pl. 127), beads, sling-balls spindle-whorls, copper bells, miniature pot, stone pestle and rotating quern were also found from this level.

In Period IV, the site was deserted as evident from the absence of constructional activities and human habitation and was used perhaps as a burial ground. Some burials have platform, while some are plain. One burial has an inscribed cenotaph. A few sherds of Chinese porcelain were found from this level.

On the basis of discovery of a few Chinese porcelain sherds with typical design and decoration, it is ascertained that such ceramic was in use during this period.

The excavation at Birchhabili Tila revealed a large number of Jaina sculptures. Some sculptures have inscriptions mostly on pedestals of deities in standing and seated postures which included Sambhavanatha, Rishabhanatha, Santinatha, Kuntunatha, Sarasvati and *yakshis* or subsidiary deities respectively. The contents of these inscriptions are donatory. The inscriptions which refer to the date, names of the deity, donor, locality and place while some are with only date and name of the donor.

Besides these, a fragmentary red sandstone piece bears two letters in Brahmi script. Palaeographically, the script is datable to the second-third centuries AD. This inscription probably is a broken part of an inscription.

The study of these inscriptions by the Epigraphy Branch, Mysore, of the Survey, revealed the use of both Brahmi and Nagari. The long fragmentary inscription is in Brahmi script while the rest are in Nagari script of tenth-eleventh centuries AD. The language of the inscription is Sanskrit mixed with a local dialect.

The three-lined inscription on the pedestal of the image of Srutidevi, Jaina Sarasvati refers to the kingdom or king as ' Vajramrajye' and locality as 'santi *Vimalacharya vasatau'*and *'Saikrikya'.* The word 'Saikrikya' is perhaps the same as Sikri and 'Vajram' as Kachhchhapaghata ruler

Vajradaman. Further this inscription on the pedestal of goddess Sarasvati also suggests that king Vajram (Vajradaman) was on the throne in Gwalior in AD 1010 while the traditional date of the king is *c.* AD 975-995.

70. EXPLORATIONS IN DISTRICT AGRA

D.V. Sharma, assisted by V.N. Prabhakar, of the Agra Circle, of the Survey, explored the villages in and around Fatehpur Sikri. The details of which are as under.

The village Chaumuhan or Chauma Shahpur, Kiraoli tehsil, located at a distance of nearly 8 km north-west of Fatehpur Sikri has at least four ancient sites. In a modern temple, a 4 feet high *linga* of red sandstone is under worship. The *linga* shows unique feature and a drapery tied with an auspicious knot. Four figures have been depicted at its base in cardinal directions, i.e., a *gana,* lion, an *ayudha* and a peacock. The *linga* has been depicted in phallic form and is datable to the ninth century AD. At another site near this modern temple were found sculptural fragments on platform. Two sculptures and one architectural member of a temple are placed on this platform. One of the sculptures resembles Yoga Narasimha which is largely mutilated.

There are some broken sculptures, collected by the local villager at a cross road of the village which are datable to tenth century AD on stylistic grounds. A *sapta-matrika* panel, fragment of a reclining Vishnu, a piece of architectural member depicting two *surasundaris,* a broken portion of male deity with *kirita-mukuta* and *yajnopavita,* a damaged *mithuna* figure, fragmentary head of female deity, images of Ganesa, dancing Chamundi, fragmentary elephant, one *Siva-linga,* in addition to the architectural members of a temple found in dozens have been identified. There is a local saying in the village that in ancient times Chauma Shahpur had four Baolis and eighty-four wells. The village is situated on an elevated mound and at certain places exposed sections display *in situ* Kushan bricks.

The noteworthy antiquity found during exploration towards the western side of the village was a broken sculpture of Naga datable to second century AD. Only the lower portion of the image is lying in an agricultural field near a *nala.* The lower base of the sculptures is projected probably for a socket. The front portion of the sculpture depicts standing male figure while back portion bears serpent coil. Similar types of sculptures are reported from Nadan in Firozabad district and one is displayed in the National Museum, New Delhi. The sandstone sculpture is of great archaeological value like Yaksa sculpture of Parkham near Mathura.

The village Imlaoda, Kiraoli tehsil located at a distance of 6 km north of Fatehpur Sikri and 3 km from Chauma Shahpur is situated on an elevated mound approximately 10 m in height. There is an ancient site towards east of the village. At the periphery of this mound an intact decorative panel was found embedded in the agricultural field. The projected portion above the ground has four registers of sculptural panels divided into horizontal bands. A figure of *yaksha* is depicted on top portion of the panel followed by rows of animals, warriors in action and seated deities. The face of the *yaksha* is mutilated while both the hands are in *abhaya* posture. Stylistically this panel may be datable to the ninth-tenth centuries AD.

In addition to these, remains of two temple sites south of the village were explored. One site has *adhishthana* of a temple *in situ* and architec-

tural fragments of temple like *bhumi, sikhara,* decorative veneering stones, etc., which are found scattered in the vicinity of this temple. Another temple site is also located towards southwestern direction of the village on the bank of an ancient tank. At this site also architectural members of the temple, fragments of sculpture and carved stones were found scattered, stylistically datable to the ninth-tenth centuries AD. From the site were collected broken sculptures in large number by the villagers which are displayed in front of their houses and are under worship. Some of the sculptural fragments include Vishnu carrying a *chakra,* mutilated figure of a deity flanked by female attendants in a nich etc. At a few places bricks of Sunga-Kushan period were found exposed in the section.

The village Dura in Kiraoli tehsil, located at a distance of 7 km south-east of Fatehpur Sikri on an elevated mound, where exist three massive *havelis* (house- complexes) all with a massive entrance gate, decorated with balconies, ornamental sandstone veneering stones and cusped-arches. The *havelis* are built in late Mughal style of architecture with pillars, cusped-arches, *chhajjas,* brackets, *balconies, jharokhas,* open courts, double-storied pavilion, two massive entrances of the forecourt, elephant stable, small court room with five-arched openings, etc. The stone architectural members are decorated with floral designs and birds like parrot and peacock.

To the west of one *haveli,* some architectural members of the tenth century temple along with mutilated sculptures of Siva. Mahishasuramardini were found placed on a plinth. This site is known as *chavand* among the villagers and is under worship. The villagers not onlv venerate these architectural members and remains of the temple but also worship these as village goddess *(devi).* The existence of such architectural remains confirms that this site also witnessed the temple/architectural activities with a shrine belonging to the ninth-tenth centuries AD, similar to Chauma Shahpur and Imlaoda.

The village Kagarol in Khairagarh tehsil, fairly big in comparison to Dura, is located at a distance of 20 km south-east of Fatehpur Sikri and 25 km south of Agra, also connected with a metalled road. It is located on a mound approximately of 15 m high with tanks and wells in all the four directions. The village has habitation of approximately twelve thousand inhabitants almost like a town. The villagers found large number of sculptures while digging foundations for construction of houses. Three house owners have still seated Tirthankara images in front of their entrances with broken head. Two life size images, one with Nagari inscription in Sanskrit language, an icon of Chandi or *prachanda yakshi,* holding a child showing horse on the pedestal, architectural members, pillar besides bases, Ganesa, musicians and dancers, *gandharvas,* panels depicting elephants with riders, etc., are found stacked in front of these houses. Some of the architectural members are datable to the ninth-tenth centuries AD. It may be mentioned here that every house in the village contains one or two fragmentary sculptures.

In front of the house of Shri Nethrapal Singh Solanki, is placed a life size sculpture of Rishabhanatha with its head broken. The *yakshi* Ambika is also shown along with bull, and Sravika, and an inscription, as under.

"Om (siddham) samvat 1039 (AD 982) phagun sudi 2 nandya sravikaya Rishabhanathasya pratima pratishthapita"

There is another image of seated Tirhankara with head broken in front of another house of Lala S/o Shri Gurudatt. Both these sculptures seated on *simhasana* belong to the tenth century AD.

Outside the village towards south-east, the remains of a Chausath-Yogini Temple on an elevated mound are of great archaeological and historical importance. The broken sculptures of Chamunda, Mahishasuramardini and mother goddess were found along with seven stone pedestals scattered on the mound which originally contained life-size sculptures of *devi.*

The village Kagarol is important for its location between Gwalior and Fatehpur Sikri which enjoyed the status of a temple city during the eighth-tenth centuries AD. The area was perhaps under the Kachhapaghata ruler, Shri Vajradama whose name appears on the Sarasvati image discovered recently from excavation at Fatehpur Sikri. During the medieval period Kagarol possibly fall in the ancient trade route.

The Village Sikri in Kiraoli tehsil, popularly known as Nagar among the inhabitants, comprises Sikri part I and part II as per revenue records. There are five temple sites out of which one is located across the Sikri-Bharatpur Road known as Chavad below the ridge, on the bank of an ancient lake. It is believed that the site was associated with a Sakti temple, highly venerated by the ruling Rajpur clan. The architectural members and broken sculptures picked up from the site are datable between the eighth and twelfth centuries AD. The sculptures depict Saiva, Vaishnava, Sakta and Jaina images, subsidiary deities, *dikpalas, naga* and *nagis,* etc.

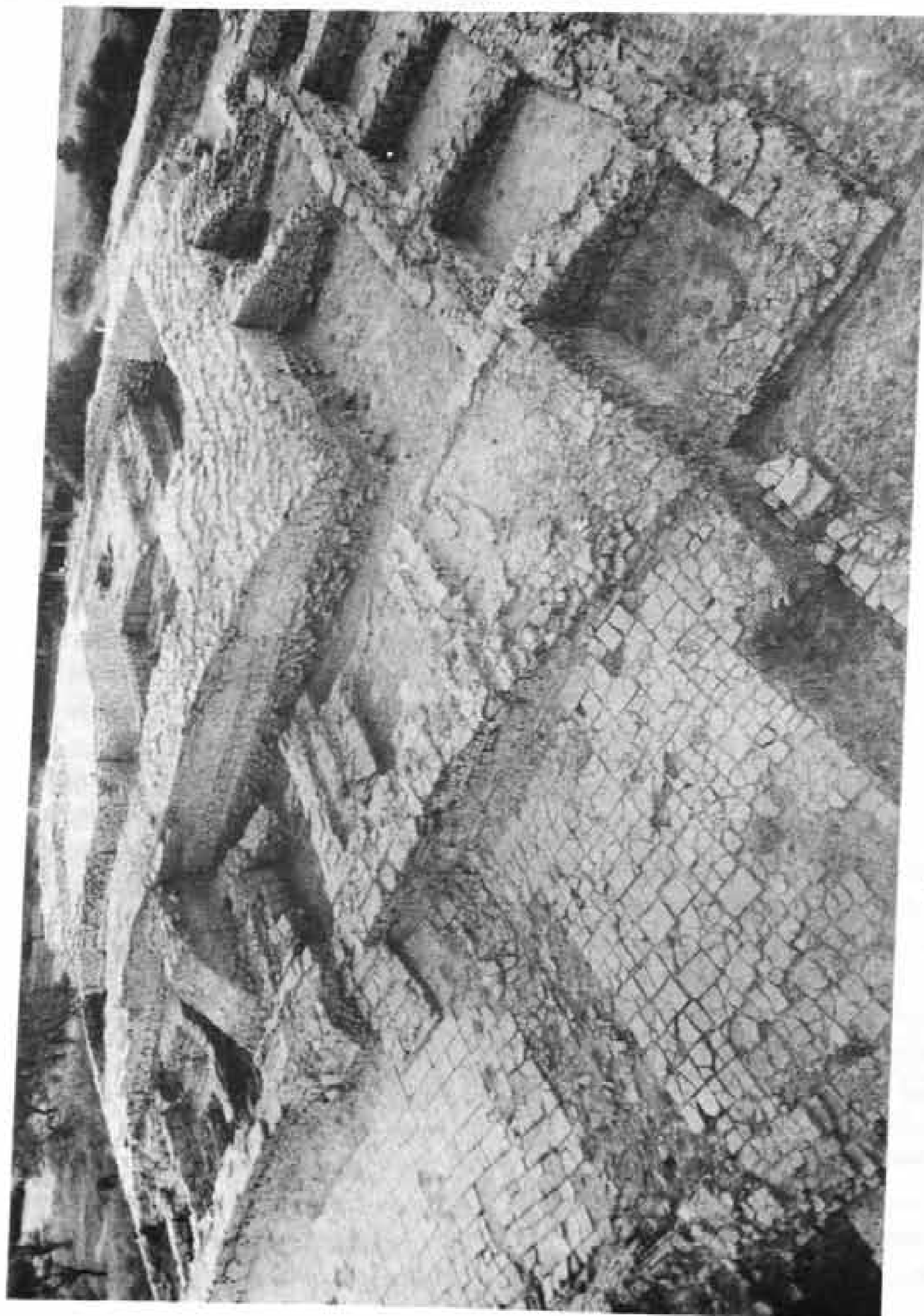
71. Excavation at Orajhar, District Balrampiur

The Lucknow Circle, of the Survey, under the co-direction of R.S. Fonia and Syed Jamal Hasan, assisted by Nayan Anand Chakraborty, Sangita Chakraborty, Lily Dhasmana, Rajeev Dwivedi, S.B. Shukla, S.K. Arora, Ravi Sankar Saxena, carried out excavation at Orajhar.

As the eastern, western and northern parts of the mound of Orajhar were previously excavated by A. Cunningham, a small-scale excavation was taken up in the center and southern parts with a view to re-examining the sequence earlier drawn by Cunningham besides tracing the remains of 'Purvarama' or Eastern monastery' of lady Vishakha, a disciple of Lord Buddha.

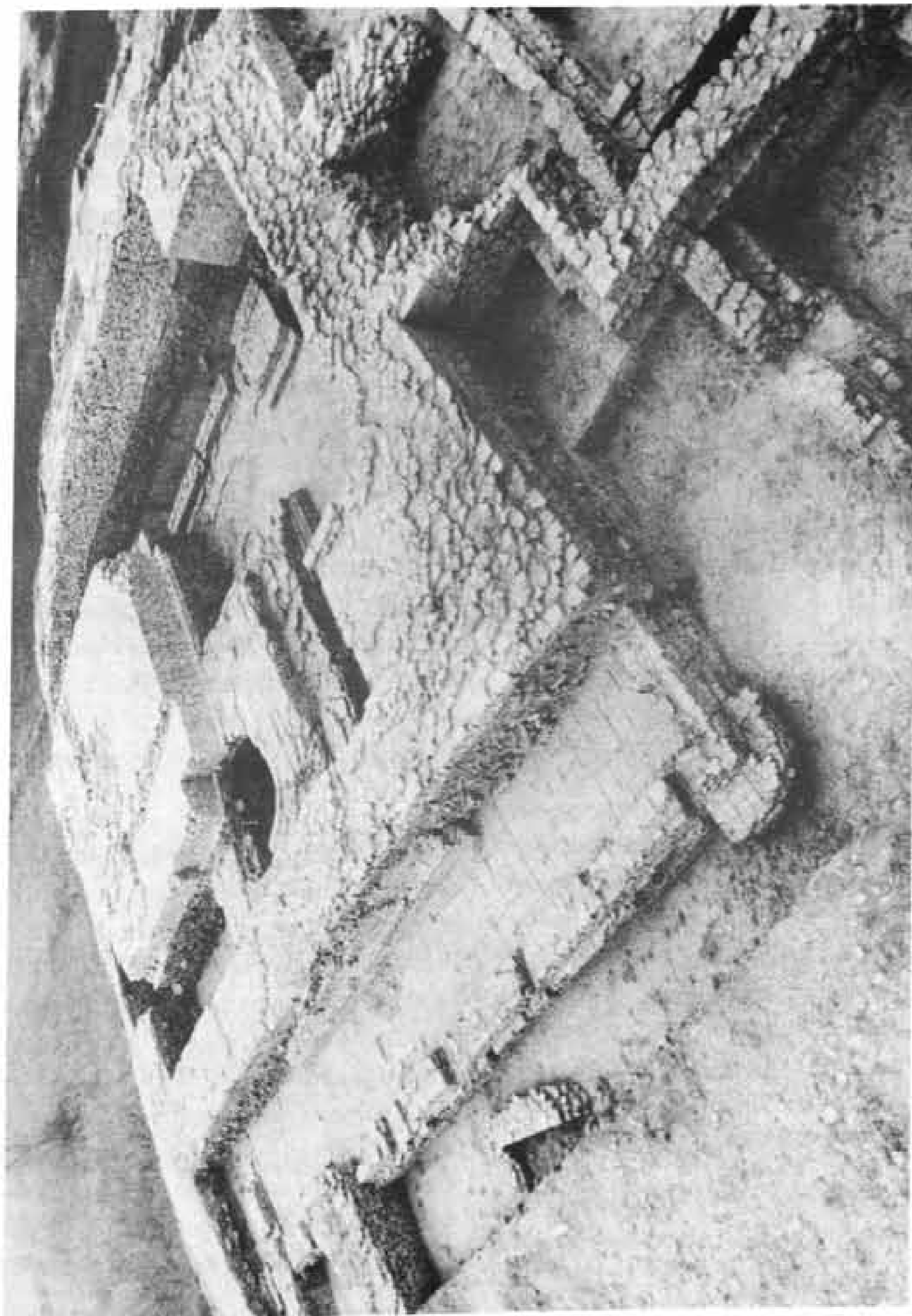
Three distinct cultural periods belonging to Kushan, Gupta and medieval, were exposed. Of these, Period I revealed a monastic-complex in the form of small cells of Kushan period (pl. 128), having brick-paved floors (37 X 24 X 5 cm). One noteworthy feature is the evidence of entrance and staircases in the southern part of the mound, proceeding towards the center. The center of the mound must have been occupied by a structure having some association with the Buddhist people of Period I, but later on this structure was destroyed by the succeeding periods. All these cells had brick paved flooring, due to the passage of time which were found missing and damaged. Towards the corner of the western side, another entrance showing four staircases were exposed, with evidence of broken pillars (for supporting roofs). The cells are uniform in size (2 m width X 1.75 m length). Likewise, the cells of the western side are also uniform in size (2.05 m to 1.80m). The cells are surrounded by enclosure wall. Due to erratic digging by A. Cunningham, the structures of northern and eastern parts of the mound

Plate 128



Orajhar: perpendicular alignment of the cells

Plate 129



Orajhar: structural remains of Periods II, III A-B

were highly disturbed. During the Kushan period, these cells were constructed all around the mound as could be noticed from the nature of slope showing an impression of tier-like structure. As indicated by the diggings, these early settlers occupied the entire mound.

The structural activity of Period II is characterized by the presence of a square plinth of Gupta Temple (6.20 m X 6.20 m), ornamented with moulded pilasters at an interval of 1.07 m towards the northern, western and southern sides. The entrance of the temple is probably towards the east, but due to superimposition of the later structure it could not be properly exposed. The height and width of the pilasters are 35 m and 42 m which resemble the excavated temple of Sahet at Sravasti. The entire temple is enclosed by a boundary wall (14.70 m in the EW and 12.80 m in the NS direction). The space in-between the boundary wall and the temple was used as a circumbulatory passage *pradakshina-patha* (pl. 129). On the basis of these remains Cunningham surmised that the total height of the temple might be around 37 m.

The people of Period II used the earlier Kushan bricks to construct the paved floor. Towards the western part of the temple two almost square platforms (1.80 X 1.80 north-west corner and 1.60 X 1.30 m south-west corner) deserve mention. The reused Kushan bricks along with Gupta bricks were utilized. The architectural feature, orientation and position of these structures have raised doubts about their exact function and the relationship with the temple.

The structural remains of Period HI are subdivided into phase 3A and 3B. Above the plinth of the Gupta temple, another square platform-like structure was exposed with eight bricks comprising the reused bricks of Kushan and Gupta periods. The length and width of this structure are 2.15 X 3.90 m. Almost at the center of this platform there is a hollow having a diameter of 1.5 m. The structure appears peculiar due to its rounded (four brick courses) top and square bottom (seventeen brick courses). The bricks of the upper part are narrower in one side and wider in the other. The barn-like structure raised purposely above the compact earth probably for storing grains.

In case of structural phase 3B the foundation of 3A was utilized, on which a star-shaped platform of a temple (6.30 X 5.75 m) was built with reused Gupta bricks, with the sizes varying from 23 X 14.5, 12 X 21.5m etc. The entire structure is surrounded by a boundary wall containing square projections on all the three sides except southwestern part. These square projections contain fourteen to seventeen brick courses. Towards the extreme north a nineteenth century grave was exposed. All the structures are made of mud-mortar.

The antiquities retrieved from the excavation are terracotta arecanut bead, fragmentary animal figurine, and a pestle from the Kushan level. Another peculiar round terracotta object having three depressions on the upper part was found perhaps used as a ritual object. Though apparently, it looks like a lid of a pot, but according to the local tradition, these ritual objects are presently used for votive purpose known as 'Dabar Baba'. Few eroded copper coins, one iron ring, round metal disc and a few British coins were found in Period III while Period II is devoid of any antiquity.

Among the pottery shapes, sprinkler, vase, bowl, inkpot-type lid miniature pot, basin, corrugated bowl, stamped pottery of typical Kushan period, are noteworthy. From the Gupta period, a few blunt-edged bowl of dull red colour were recovered. From Period I various shapes like jar, basin, lid, spout of dull red colour in medium to coarse fabric were collected.

72. EXPLORATION IN DISTRICT BAREILLY

Ram Vinay assisted by Rajiv Trivedi, of the State Archaeology Department, Government of Uttar Pradesh, under the direction of Rakesh Tewari, conducted village-to-village survey in Faridpur tehsil. During the course of exploration following antiquarian remains were brought to light.

Village/Site	*Nature of remains*
Baval Basantpur	Red ware (medieval period), burnt-brick
Bhadurpur	Red ware, bricks (medieval period) and terracotta bead
Bhadurpur-ka-Khera	Red ware (Kushan period)
Gulab Nagar	Red ware (Gupta period) and burnt-bricks
Iidgah-ka-Khera	Red ware and glazed ware
Kadirganj	Grey ware, black-slipped ware, iron slag and agate bead
Khalpur	Red ware (medieval period)
Khanpura	Red ware (Gupta period), terracotta bead, human figurine and iron slag
Larpur	Red ware, grey ware (medieval period), burnt-brick and animal figurine
Nad-ka-Khera	Glazed ware (medieval period)
Pachoumi	Red ware (Kushan, Gupta to late medieval period)
Rawal Kela	Red ware (medieval period) and iron slag
Rudhouli Kala	Red ware (Kushan to Gupta period) and terracotta bead
Saripur	Red ware (Gupta period)
Sunora murarpur	Red ware (medieval period) and iron slag and terracotta bead

73. EXPLORATION IN DISTRICT BHARATPUR

The exploration was carried out by D.V. Sharma, assisted by V.N. Prabhakar, of the Agra Circle, of the Survey, in village Chichana of Rupvas tehsil. The village, located on the left side of Fatehpur Sikri-Bharatpur Road, approximately at a distance of 8 km from Fatehpur Sikri and 4.5 km from Chauma Shahpur, has a shrine of Devi with life-size sculptures housed inside. Two life-size sculptures of *dvarapala* were also found embedded in the wall along with architectural members of the temple. There is a Chabutara outside the temple with fragments of sculptures, architectural members, and antiquities datable to the ninth-tenth centuries AD. These sculptures are under worship. Inside the sanctum-sanctorum of the temple, a standing Vishnu sculpture flanked by deities and attendants was found intact. This Vishnu image is under worship and identified as 'Languria' by the villagers. The sculpture is covered with vermilion and datable to the tenth century AD. In addition to this a large number of sculptures, decorative panels, architectural members were found embedded in the walls of the temple. The Chichana Devi Temple has large number of massive sculptures, architectural members and other antiquities datable to the ninth-tenth centuries AD. It appears that Vaishnava, Saiva and Sakta temples were built here together. The village Chichana is also situated on an ancient mound like Chauma Shahpur and Imlaoda. The bricks of Sunga-Kushan period were also found re-used in the modern houses.

74. EXPLORATION IN DISTRICT CHANDAULI

The Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University and Department of Archaeology, the Government of Uttar Pradesh, jointly conducted explorations in Chakia, Chandauli and Sakaldiha tehsils, under the direction of Purushottam Singh, Ravindra Nath Singh and Rakesh Tewari assisted by Laxmi Shanker Yadav and Sunil Kumar and discovered the following sites of archaeological interest.

Village/Site	***Nature of remains***
Tehsil Chakia	
Aurwatand (24°52'07"N;83°22'ir'E)	Rock-shelter with paintings and mesolithic tools
Banda (25° 06' 07" N; 83° 13' 46"E)	Early historical pottery
Baraidih (25° 05' 00" N; 83° 19' 03"E)	Late medieval period
Ben (25°03'31"N;83°18'22"E)	Black-slipped ware and grey ware pottery and remains of group of temples, tenth-thirteenth century
Bhikhampur (25° 40' 20" N; 83° 10' 50"E)	Late medieval fort

Village/Site	***Nature of remains***
Bhorsar (25° 08' 14"N;83° 17' 32"E)	Black-slipped ware, NBPW and grey ware pottery
Gurutwamod (24° 55' 54" N; 83° 12' 7" E)	Mesolitic tools, factory site
Keradih (25°14'43"N;83°13'46"E)	Post-Gupta and late medieval period
Lathaura (25° 6' 12" N; 83° 12'7" E)	Black-slipped ware, NBPW and grey ware
Naugarh/Naugarhkot (24° 50'22" N; 83° 21'11" E)	Black-slipped ware, NBPW and grey ware
Pachwania (25°5'0"N;83°13'46"E)	Post-Gupta period
Parasikalan (25° 9' 38" N; 83° 18' 12" E)	Post-Gupta period and remains of temple
Prabhunarainpur/Hiramanpur (25° 0'48" N; 83° 10'32" E)	Black-slipped ware, NBPW, grey ware and red ware
Puranadih (24° 59'48" N; 83° 10'40" E)	Iron slags and temple remains of eighteenth century AD
Rampur (25° 14'48" N; 83° 15'59" E)	Post-Gupta period, bricks etc.
Semar Sadhopur (24° 51' 18"N;83°21'50"E)	Mesolithic tools and painted rock shelter

Village/Site	Nature of remains
Sikandarpur (25° 5' 16" N; 83° 11' 35" E)	Black-slipped ware, black-and-red ware, NBPW, grey and red ware
Takia/Takiaper (25° 5'6" N; 83° 16'4" E)	Black-slipped ware, black-and-red ware, NBPW, grey ware, red ware and post-Gupta bricks
Utraunt (25° 7'40" N; 83° 14' 18" E)	Remains of early medieval temple
Tehsil Chandauli	
Barhauli (25° 15'49" N; 83° 10'26" E)	Early historical pottery
Chanehta (25°12'11"N;83°14'54"E)	Early historical period
Dush Khas (25° 14'46" N; 83° 11'22" E)	Post-Gupta period
Ganj Khwaja (25°16'21"N;83°11'47"E)	Post-Gupta and early medieval period
Guas (25°15'0"N;83°09'0"E)	Gupta and post-Gupta period
Jasuri (25° 15' 12"N;83°15' 17"E)	Late medieval period
Khurhunja (25°12'30"N;83°14'40"E)	Late medieval period
Marai (25° 16' 16"N;83°10'35"E)	Black-slipped ware, NBPW and grey ware

Village/Site	*Nature of remains*
Negura (25° 14'36" N; 83° 16' 15"E)	Early historical pottery
Tehsil Sakaldiha	
Balua Sarai (25°24'13" N; 83°1l'11"E)	Remains of post-Gupta temple
Derwa Khurd (25° 25' 35" N; 83° 10' 35"E)	Black-slipped ware, NBPW, grey ware, terracotta pestles and sculptural fragments
Kaili (25° 19' 44" N; 83° 09' 28"E)	Temple site with sculptural fragments
Kanwar (25°22'20"N;83°1l'20"E)	Sculptural fragments of tenth-twelfth century
Kurahana (25° 19' 16"N;83°08'54"E)	Post-Gupta and later period
Mahraunda (25°21'57"N;83°10'48"E)	Sculptural fragments of early medieval period
Mahuar (25° 26' 13"N;83°10'00"E)	Post-Gupta structures and sculptural fragments
Mathia (25° 28'23" N; 83° 10' 17"E)	Early historical remains
Matigaon (Farsand Mohanpur) (25° 18' 23" N; 83° 14' 07"E)	Temple remains with habitation site, bricks of Kushan and post-Gupta periods, numerous sculptural fragments including a broken image of Harihara

In addition to the above, a site known as Nindaur(25° 13' 39" N; 83° 17' 0"E) in Hata sub-division of Bhabua district of Bihar was explored. The site is located on the U.P. - Bihar border, just outside the survey area. It is a massive city site with thick fortification walls containing sherds of black-slipped ware, black-and-red ware, grey ware and red ware, besides Maurya-Kushan bricks, ring-well, pestles, net-sinkers, Kushan terracottas, votive plaque, headless image of Jaina Tirthankara and other sculptural fragments.

75. EXCAVATION AT DADUPUR, DISTRICT LUCKNOW

The excavation at Dadupur, in District Lucknow was undertaken by the Department of Archaeology, the Government of Uttar Pradesh under the direction of Rakesh Tewari and Rakesh Kumar Srivastava, assisted by K.K. Singh, Ram Gopal Misra, Balram Krishna, Manmohan Dimri and Ram Ji. The site (26° 41' 12" N; 80° 49' 05" E) is situated on the left bank of Nagwa-Nala a tributary of the Sai river, at a distance of about 23 km from the district headquarters, on Lucknow-Kanpur Road near Banthara. It extends an area of about 21.34 acres. The excavation was done with a view to ascertain whether there was deposits of pre first millennium BC. In all four trenches, i.e., DDR I, DDR II, DDR III and DDR IV were laid down on the northern, western, eastern and southern parts of the mound with a five-fold cultural deposit of maximum 4.25 m thickness in Trench DDR III.

Period I, represented by layers 13, 13A, 14 and 14 A, is marked by the presence of black-slipped ware and red ware. The main shapes in red ware are bowl, dish, vessel with cord impression and basin. Most of the red ware potsherds have a tendency to peel off like OCP. Hand-made and wheel-turned, both the types, are common. Black-slipped ware comprises dishes only. A few vase-shaped terracotta beads, unidentified bone objects and antlers are the other associated finds. Burnt-clay nodules with reed impressions indicate that the structures of this period were made of wattle-and-daub. There is notable presence of a few ill-baked bricks of husk-mixed clay with finger marks.

Period II is represented by layers 11 and 12, comprising black-and-red ware, red ware and black-slipped ware. Main shapes are bowl, dish, water vessels, basin and storage-jar. A number of bone-points and charred bones with cut marks are the other associated finds. Absence of metal objects is also notable.

Period III, represented by layers 8, 9 and 10, is marked by the appearance of iron, black-slipped ware, black-and-red ware and red ware continued with the main shapes like bowl, dish, water vessel, storage-jar, etc. Burnt-clay nodules with reed impressions, iron arrow-heads and bone awls, terracotta beads and hop scotches, besides, a large quantity of bones form other associated finds.

Period IV, represented by layers 7 and 7A, is marked by the appearance of PGW and grey ware. Black and-red ware, black-slipped ware, and red ware continued. Main shapes of pottery are as of Period III. PGW sherds bear oblique vertical strokes, concentric circles and dots in black pigment below the rim. Bone artefacts such as arrow-heads, points and awls, stone sharpener, hop scotches, terracotta beads and iron objects, besides a large quantity of bones are among the associated finds.

Period V is marked by the appearance of NBPW along with painted and plain red ware, black-slipped ware, black-and-red ware, plain and painted grey ware. It is notable that the PGW is restricted to the lower levels only. A number of red ware and black-and-red ware sherds bear cord

impressions on the outer surface. A few kiln-burnt bricks, iron and bone artefact, terracotta discs, gamesman and a small terracotta female figurine are the other noteworthy antiquities.

76. EXPLORATION IN DISTRICT MAHOBA

In continuation of the previous year's work (*1998-99,* pp. 188-193), Ambika Prasad Singh, assisted by S.K. Dubey, of the Jhansi Unit of the State Archaeological Department, the Government of Uttar Pradesh, under the direction of Rakesh Tewari, resumed village-to-village exploration in Kabrai block. During the course of exploration a number of sites consisting of ancient monuments, sculptures and other archaeological remains datable between ninth-tenth century and nineteenth century AD were brought to light. Of these the stone temples and architectural remains from the villages Bamhori-Kaji, Singhpur-Baghari, Dhikwaha, Raipur, Khurd, Mawai, etc., are noteworthy.

The villages, and their archaeological finds are as under.

Village/Site	*Nature of remains*
Bamhori Gosain	Temple (c. eighteenth century AD)
Bamhori Kaji	Medieval temple and tank
Bara	Temple (c. eighteenth century)
Barat Pahari	Medieval sculptures and temple (*c.* eighteenth century)
Bharara	Medieval sculptures, tank, *sati*-stone, temple (c. seventeenth century)
Chandu	Medieval sculptures and temple (*c.* eighteenth century)
Chikhra	Medieval sculptures and temple (*c.* eighteenth century)
Damora	Medieval sculptures, ruins of temple and tank Medieval
Darhat Maf	sculptures, tank, temples Medieval temple and
Dhikwaha	sculptures Medieval temple
Jujhar Kabrai	Medieval sculptures, ruins of a temple and tank
Kali Pahari	Medieval sculptures

Village/Site	***Nature of remains***
Karhara	Temple *(c.* nineteenth century)
Kirari	Medieval sculptures, tank, ruins of a palace and tomb
Kumdhora	Temple *(c.* eighteenth century)
Majhalwara	Temple *(c.* nineteenth century)
Makarbai	Sculptures, temple, tank (medieval) and *sati-stones*
Mawai	Medieval temple and dilapidated fortress
Mirtala	Medieval sculptures, tank, temple *(c.* eighteenth century)
Naiguwan	Medieval tank
Pahara	Medieval tank, sort-stone, temple (c. eighteenth century)
Rahilia	Medieval sculptures, tank and temple
Raipura Khurd	Medieval temples
Ratoli	Medieval tank
Sijahari	Medieval temple
Sijwaha	Medieval sculptures and temple
Singanpur Baghari	Medieval temple, sculptures and red ware
Srinagar	Fort, temple (c. eighteenth century)
Sukora	Medieval temple and tank
Thana	Tank and fortress
Tikamau	Medieval sculptures
Tindoli	Medieval sculptures and temple
Urwara	Medieval sculptures, temple and tank

77. EXCAVATION AT AGIABIR DISTRICT MIRZAPUR

In continuation of the previous year's work *(1998-99,* pp. 193-197), the Department of Ancient Indian History, Culture and Archaeology, Banaras Hindu University, carried out further excavations at Agiabir under the joint direction of Purushottam Singh and Ashok Kumar Singh with the assistance from Santosh Kumar Singh, Sharawan Kumar, Ram Badan Ram and Barun Kumar Sinha.

Besides imparting field training to the undergraduate and post-graduate students, the main objective of the current field season was to obtain a complete sequence of cultures at the main mound where carved stone pillars representing parts of an early medieval temple were lying on the surface. In all, eight trenches measuring 5 x 5 m square were opened (pl. 130). The excavation was carried out upto a maximum depth of 5.40 m without reaching the natural soil. In all, several structures made of burnt bricks and ascribable to two periods (Kushan and Gupta periods) were exposed as detailed below.

Structure 1 exposed in Trenches YE -61 and II, was made of fresh as well as re-used bricks (size 40 X 26 X 6 cm). This structure had eight courses. Structure 2 running north-south with seven extant courses was made of fragmentary bricks only. Structure 3 (pl. 131) was running in east-west direction while its return wall was seen at right angle to it in north-south direction. This structure has three constructional phases. The wall of the first phase was 75 cm wide and was made of bricks (39 X 26 X 5 cm). In the second phase this structure was strengthened by adding a retaining wall of thirty-three courses. During the third phase this wall was further buttressed by a stepped-wall, presently standing to a height of fifteen courses. This wall was also largely made of re-used bricks. This wall is 8 m long (north-south) and 11 n long (east-west). The size of this structure indicates that this is a public/religious building presumably used as a temple. Structure 3-A is part of a rectangular room with entrance on the eastern side. The bricks used in this room are of two sizes (44 X 29 X 6 cm and 44 X 26 X 6 cm respectively). The eastern wall has twenty-six courses of bricks. The size of this room is 6.80 X 2.50 m. Structures 3B and 3C are later additions running in east-west direction between Structures 3 and 3A. These walls are also made of re-used bricks and stand to a height of twenty-two and twenty-one courses respectively (pl. 132). Structure 4, running north-south was made of bricks (42 X 28 X 5 cm). Structure 5 is underlying below the remains of Structure 3 which had five courses intact and was found running in the north-south direction. It was made of bricks (45 X 28 X 5 cm). The thickness of the brick walls and the large size of the room indicate that it was also a temple of earlier period. During the excavation a large number of roof tiles were recovered from inside the room giving an idea about the roofing arrangement.

The stone pillars lying on the surface of the mound represent parts of a temple of early medieval times. Some typical pottery types like sprinklers of Red Polished ware, an incense burner and bottle-necked jars having a small perforation in the neck for controlling the flow of the liquid were recovered from the vicinity of the buttressed wall. All these pottery forms provide substantial indications that this building was used as a temple or a religious place.

The ceramic industry comprises essentially red ware with some sherds of Red Polished ware.

Plates 130-131



130



131

Agiabir: 130, *exposed trenches, general view and* 131, *excavated structures*

Plates 132-133



132



133

Agiabir: 132, close view of structures 3, 3A & 3B and 133, terracotta sealing bearing legend Harisenasya

The principal types in the former include various type of vases and storage-jars, inkpot-type lids and knobbed-lids, *parai,* miniature vessels and decorated sherds. Red Polished ware sprinklers and bottle-necked jars are the principal types which were confined to the top six layers excavated during the current field season. This stratigraphic evidence provided a firm time-bracket to this ware at the present site. Similar evidence comes from other sites like Sringaverapura, located 120 km upstream on the left bank of the Ganga.

As stated above, the Red Polished ware continued in layers 1-6 with short-necked jar (sprinkler) as the main type. The limited excavation yielded twenty-eight pieces of neck portion of sprinkler. A similar discovery comprises bottle-necked jar with small perforation in the body to control the flow of liquid. Similar pieces were found at Kausambi and Sringaverapura.

Other antiquities comprise a sealing of baked clay with the legend *Harisenasya* engraved in Brahmi characters of late third/early fourth century (pl. 133) and a copper coin, terracotta figurines, discs, besides antimony rods, objects of copper and iron.

Two test pits of 2 X 2 m and 3 X 3 m size respectively were excavated on the northern and southern slopes of the main mound (Mound-1). Natural soil was struck in these two test pits at a depth of 2.00 m and 4.50 m respectively. In both the trenches remains of the first three periods were found. This would *inter alia* provide firm evidence that the inhabitants of the earliest period had occupied a much larger area, approximately 14 hectares.

78. EXCAVATION AT TORWA, DISTRICT MIRZAPUR

Tokwa (24° 54' 20" N; 82° 16' 45"E) is situated on the Belan and Adwa in Lalganj subdivision, at a distance of 68 km from Mirzapur city in southeastern direction, at a distance of 8 km east of Baraundha. The site was taken up for excavation by the Department of Ancient History, Culture and Archaeology, University of Allahabad, under the guidance of V.D. Misra. The excavation was carried out by H.N. Kar, Rajendra Prasad, V.K. Khatri, Kamlesh Kumar, Sharad Suman, Ram Naresh Pal and Rajesh Kumar.

Northern margin of the site is flanked by the River Belan while the southern is facing the Adwa. The western margin of the site looks like the peak of a triangle. The site is quite extensive. Even at present, it covers an area of about 27579 sq m. As one moves eastward, the width of the site gets widened. The eastern limit of the site is upto the village Tokwa. For the shake of convenience the entire site is divided into three sub parts: Tokwa 1, Tokwa 2 and Tokwa 3 from west-to-east.

Though the site was discovered long back in seventies, it was revisited in 1999 and extensive explorations were done. The explorations at Tokwa resulted in the discovery of hand-made pottery comprising cord-impressed, rusticated, burnished red, burnished black, black-and-red and ordinary red wares, on the one hand and black-slipped ware, black-and-red and red ware on the other. The second assemblage of the pottery is wheel thrown. Surface exploration also resulted in the discovery of Kotia type of pottery and iron objects as well. On the basis of these scattered evidences it appears that the site was occupied during the Neolithic period. In this way it is a mid-way station in the Vindhyan Neolithic

culture-complex between Koldihwa, Mahagara, Panchoh on the one hand, all lying in the Belan valley in the Koraon sub-division of Allahabad district of Uttar Pradesh and Kunjhun in the Son valley in Sidhi district of (Madhya Pradesh). The Department of Ancient History, Culture and Archaeology, conducted a small-scale excavation in 1981 at a Neolithic site of Indari in District Mirzapur in the Adwa valley, which yielded cord-impressed pottery, rusticated pottery, some burnished red and black sherds along with post-holes. The available evidence indicated that it was an integral part of the Vindhyan Neolithic culture-complex. The artefacts collected from the site indicate that the site was under occupation in the Chalcolithic and early Iron Age as well.

The exploration at the site raised many issues such as: the thickness of the occupational strata pertaining to the Neolithic people; the nature of Neolithic culture at the site and its relation to the other Neolithic sites already excavated and explored in the Vindhyan area; evolution of Chalcolithic culture at the site; whether the Chalcolithic people at the site lived along with the Neolithic people or the Chalcolithic culture at the site evolve in an iron using culture with the passage of time or the iron using people came at the site when it had already been deserted by the Chalcolithic people; and lastly about the occurrence of Kotia group of pottery on the surface of the site

At Tokwa I two Trenches H-8 and H-9, each measuring 5 sq m were laid out. In this connection, it may be pointed out that the area marked by these two trenches, particularly the central point at these two trenches constituted the highest elevated point of the mound. It was likely to yield a complete vertical record of the culture at the site. General slope of the area is from east-to-west and north-to-south. To the west of Trench H-8 a control pit measuring 1 X 1 m was also laid out. Trench C-9 was also selected for excavation. As it is located just on the section cut by River Adwa, the area was selected for excavation to know the nature of deposit towards the bank of the Adwa. In this trench only one square (E-4) of 1 x 1 m area was excavated.

The combined testimony of the excavation of Trenches H-8, H-9, C-9 and control pit brought to light the archaeological evidence of three cultures: Neolithic, Chalcolithic and Iron Age. The occupational strata, divisible into as many as 16 layers, measured 4.00 m.

Layers 1 and 2 measuring 58 cm, slightly compact and yellowish deposit yielded sherds of NBPW, black-slipped ware, black-and-red wares, the last one further sub-divisible into a number of sub-groups. Before the excavation was started, there was inkling of getting the NBPW at the site. On the other hand due to the occurrence of Kotia group of pottery it was suspected that the people using this type of pottery might have settled at the site. However, the occurrence of NBPW sherds opened a new vista. Some of the dishes have stamp designs in the center as is the case with several NBPW sites in the Ganga Valley. In this connection it is pertinent to note that dishes though occurring in black-slipped ware as well, bear no stamp design of this type. Along with the ceramic assemblage noted above, these two layers yielded a good number of bone arrow-heads, animal bones, beads fashioned on semiprecious stones, terracotta beads, glass bangles, copper and iron objects, fragments of querns and mullers, sandstone fragments,

etc. A container made of cylindrical hollow bone having cover on both the sides is an interesting find of this phase. Structural activities - pit hearths and post-holes are associated with these two layers. Burnt-clay lumps with reed impression suggest the wattle-and-daub construction. In some of the pits disturbing these deposits, Kotia type of pottery was obtained suggesting the periodical occupation at the site by the Kotia group of people.

Layers 3 and 4 measuring 46 cm constitute the pre NBPW horizon associated with iron. These layers have yielded sherds of black-and-red ware black-slipped ware and various types of red ware, bone arrow-heads, a few copper objects, beads of semiprecious and terracotta, fragments of querns, mullers, hammer-stones, animal bones and carbonized cereals in good number. These layers are also associated with pit hearths and structural hearths. Occurrence of post-holes and clay lumps with reed impressions suggest the wattle-and-daub structure. Probably they used to build round huts. In this connection, it may be pointed out that ceramic assemblage of this phase is a continuum of the ceramic tradition associated with underlying Chalcolithic deposit of the site. However, the introduction of iron at this stage marks a new chapter. Here it may also be pointed out that this stratigraphic position at Tokwa tallies well with the evidence obtained from a number of sites like Chechar-Kutubpur, Chirand, Taradih and Senuar in Bihar on the one hand and Narhan, Khairadih, vlasaondih, Sohgaura, Rajghat, Prahladpur on the other. The stratigraphic status of iron was also confirmed by the excavations at Jhusi, Agiabir, Raja Nal-Ka-Tila and Malhar. At all these sites iron antedates the NBPW and is found with a ceramic tradition and in archaeological context which indicates the continuity of Chalcolithic tradition in respect of pottery, bone arrow-heads, etc. This indicates that the Chalcolithic culture of the Vindhyas and the Mid-Ganga Valley acquired information of iron technology at the fag end of the strata.

Layers 5 to 7 light, yellowish loose and ashy in character, measured 50 cm in thickness and represent the Chalcolithic culture of the site. These layers have yielded sherds of black-and-red ware, black-slipped ware and red ware, the last one further divisible into a number of sub-groups. There are different types of bowls, dishes, basins, footed and perforated basins, medium-sized vases, storage-jars, pedestalled-bowls, etc., of moderately levigated clay occasionally with paintings and the pots are well fired. Ceramic industries and pottery types associated with this phase compare well with its counterparts at Chechar-Kutubpur, Chirand, Senuar, Taradih in Bihar and Sohgaura, Narhan, Khairadih, Jhusi, Agiabir, Raja Nal-Ka-Tila. Malhar, etc. in Uttar Pradesh. Besides the ceramic assemblage, these layers have also yielded bone arrow-heads, a few copper objects, semiprecious and terracotta beads, flakes, blade fragments, fragments of querns, mullers, hammer-stones, good number of animal bones and carbonized cereals as well. Burnt-clay lumps suggesting wattle-and-daub structure were also traced. A number of hearths, both structural and pit hearths, were also exposed. Occurrence of post-holes suggested the existence of hut-like structures. Another significant point associated with this culture is digging of various pits. As a result of this, underlying Neolithic horizon was disturbed.

Layers 8 to 16 measuring 2.47 m represent the Neolithic horizon at the site. These layers have yielded cord-impressed pottery, rusticated ware and burnished red and burnished black sherds

as well. Other antiquities of the period include bone arrow-heads, beads fashioned on semiprecious stones and terracotta, fragments of querns, mullers, hammer stones, etc. Microliths fashioned on semi-precious stones include flakes, flake fragments, blades, blade fragments, scrapers, triangles, etc. Animal bones obtained form these deposits are significant both from the point of view of number as also from the state of preservation. Oval or round hut floors, encircled by post-holes were also exposed from this phase. Ceramic industry of this phase is hand-made. Rice husk is used as degraisant, which is, seen both on the surface and also in the core of potsherds. The potsherds are generally thick in fabric though the pots in medium to fine fabric are also met with. The pots are ill-fired and clay used is not well levigated. As a result small granules are discernible in the core of the pots. Shapes are also limited in comparison to the functional types of overlying Chalcolithic culture which include bowls (shallow and deep), basins (shallow), medium-sized vases, etc., apart from the prevalence of spouted vases.

Distribution of the post-holes on the periphery of hut floors besides the presence of burnt-clay lumps indicated the occurrence of circular/ semi-circular wattle-and-daub structure.

The Neolithic horizon at the site witnessed disturbance in subsequent period, as deep pits were cut into these deposits mostly by the Chalcolithic people. The excavation also yielded cereal remains such as wheat, rice, green gram *{moong)* and mustard. The actual identification of these cereals is under process. Fragments of querns, mullers, hammer-stones etc. were also reported from this horizon besides samples of charcoal.

From excavation at Tokwa it appears that there was a gap between the disappearance of the Neolithic culture and the arrival of the Chalcolithic people as these two cultures exhibit different types of ceramic tradition. While Neolithic potter)' is hand-made, the Chalcolithic is wheel-thrown. There is also a difference in the treatment of clay for manufacturing of pots. The characteristic ceramic tradition of the Neolithic is not represented in Chalcolithic horizon. Morever. the uppermost Neolithic horizon yielded small potsherds indicating thereby that after desertion of the site by the Neolithic people, it remained unoccupied for a considerable time before the arrival of Chalcolithic people. However, this needs further investigation.

The work also indicated that as at some other sites both in the Vindhyas and the Ganga Valley, iron antedates the NBPW. The advent of iron object is heralded in the last stage of Chalcolithic phase. Excepting the occurrence of iron there is no change in the early Chalcolithic and marginal Chalcolithic. It also revealed that stratigraphically the appearance of NBPW is later than the introduction of iron and the Kotia ware is later than NBPW.

79, EXPLORATION IN DISTRICT MIRZAPUR

The explorations were conducted in the river valleys of the Belan and Adwa in Lalganj sub-division of Mirzapur district by the Department of Ancient History. Culture and Archaeology, University of Allahabad, under the direction of V.D. Misra. The explored area covered 35.5 km from Sirsi dam on the Belan in the east to Baraundha on the Belan in the west. The explorations revealed about sixteen sites ranging from

Middle Palaeolithic/Upper Palaeolithic to the Iron Age megalithic cultures.

		Nature of remains
Amirti (24° 56' 10" N; 82° 16' 15"E)	On the left bank of River Belan, south of Baraundha at a distance of 4 km north from Tokwa	Thick red ware and grey ware pottery, typical of Kotia group
Bedaur (24°52'0"N;82°17'04"E)	About 1 km south of village Bedaur, just on the right bank of River Adwa at a distance of 3 km south from Tokwa	NBPW sherds (bowls and dishes) and red ware, thick grey ware analogous to the Kotia pottery along with red ware (some finials also)
Chatarahia (24°49'30"N;82°16'0"E)	On the left bank of River Adwa, south of Bedaur village at a distance of 6.5 km from Tokwa	Kotia type pottery and some stone objects
Dhendhi (24°43'30"N;82°45'0"E)	East of village Majhigawan on the right bank of River Adwa near village Majhigawan, at a distance of 48 km from Tokwa	Neolithic celt made on chunk; cores and blade fragments made on chert and chalcedony; hand-made pottery of thick red ware with concentration of rice husk
Khaira (24° 52' 30" N; 82° 50' 30"E)	About 1 km west of Great Deccan Road near Pandey-ka-Dihwa	Kotia type pottery including thick grey ware and red ware, stone weights made on sandstone
Kharihat (82°23'0"N;24°53'0"E)	On the left bank of Belan and south of village Kharihat at a distance of 8 km from Tokwa	Kotia type pottery including thick grey ware (some with slip on the rim portion of pots), Kushan pottery including knobbed-lid
Kota (24° 54' 30" N; 82° 48' 15"E)	On the right bank of Belan on the Baraundha-Mirzapur Road at a distance of 9 km, north of the confluence of Belan and Adwa (Tokwa)	Red ware, black-slipped ware and NBPW sherds, dishes and bowls, sharply carinated *handi* and spouted-*lota*, ring-well and fragments of terracotta
Mawai Khurd (24°53'0"N;82°20'0"E)	On the left bank of Belan at a distance of 4.5 km from Tokwa	Kotia type pottery, chalcedony flakes

Site	*Location*	*Nature of remains*
Murcha (24°52'0"N;82°33'0"E)	On the flood plain of Sirsi Dam near village Banki on the western bank of Bakahar river at a distance of 26 km from Tokwa	Chalcolithic; red ware, black-slipped and plain grey wares, with shapes such as bowls, corrugated deep bowls, dishes, jars, *handi, karahi,* footed and perforated basin etc. along with a few sherds of hand-made cord-impressed and rusticated ware; animal bones, pottery dish, burnt-clay lump with reed impression etc
Nibaval (24°55'0"N;82°17'30"E)	Just opposite Tokwa, on the north bank of River Belan	Middle and Upper Palaeolithic artefacts comprising end scraper, flakes and blades made on fine-grained quartzite and retouched blades, blade-fragments and core made on chert; thick grey ware and red ware pottery of Kotia assemblage along with iron slags and glass bangle
Naugawan (24°54'30"N;82°16'30"E)	On the left bank of Adwa across Tokwa	Kotia type pottery, iron slags, terracotta balls and spouts in red ware
Seruwa (24°51'20"N;82°38'0"E)	To the south of village Seruwa on the right bank of Bakahar river, a tributary of Belan. It lies to the east of Murcha at a distance of 35 km from Tokwa	Thick grey ware and red ware pots with thick glaze on its surface and glass bangles
Shitalgarh (24° 53' 10"N;82°38'0"E)	On the right bank of Bakahar river near Sirsi dam at a distance of 35.5 km from Tokwa	Kotia type pottery
Sothia (24°5r0"N;82°18'05"E)	To the north-east of Kotarnath Temple, south of Adwa	Sculpture pieces, sherds of red ware with post-firing incised design, iron slags, stone sharpener, and chert flakes

80. EXPLORATION IN DISTRICT MIRZAPUR

In continuation of the last year's work (*1998-99,* pp. 197-200), Girish Chandra Singh of the State Archaeological Department, the Government of Uttar Pradesh, under the direction of Rakesh Tewari, resumed village-to-village exploration in city Block of Sadar tehsil, in District Mirzapur. During the course of exploration fifty-three archaeological sites, comprising ancient potsherds and other antiquarian remains, were located. Mention may be made of Barji Mukundpur, Shahpur Chaunsa and Indi Parbatpur, which have yielded NBP W, black-slipped ware, grey ware and red ware. A broken stone block bearing an engraved inscription in Gupta Brahmi script is also notable. Also reported were a number of beautiful sculptures of Vishvarupa Vishnu, Vishnu, Surya, Kubera, Mahishasurmardini Durga, Kalyanasundara, Siva and Nataraja Siva noticed in villages Barji Mukundpur and Gangawat. These images, on stylistic ground, may be placed in sixth-seventh century. Post-Gupta images of Seshasayi Vishnu, Ravananugraha. Kubera, Ambika, etc. from villages Raipur Pukhta, Masari, Tengrahi and Nauhan, etc. are important representatives of the contemporary sculptural art. Remains of stone as well as brick temples are noticed at several sites. Besides, a Devanagari inscription of eleven lines, engraved on a stone-slab measuring 61 x 56 x 15 cm. In Chindlikh Dube and *sarvatobhadra Krishna Lila stambhas* are the other important finds.

A list of the explored sites and brief description of their antiquarian remains are given below.

	Nature of remains
Aghwar	Architectural remains (ninth-tenth century), miniature stone temple (tenth century), *sarvatobhadra Krishna lila stambhas,* stone *kolhus-some* with Devanagari inscriptions (eighteenth-nineteenth century)
Anantram patti	Stone *kolhus* of eighteenth-nineteenth century
Atari	Red ware and Brahmanical sculptures (medieval)
Barhauli	Architectural remains (late medieval period), *sarvatobhadra Krishna lila stambhas* (twelfth-thirteenth century)
Barji Mukundpur	NBPW, black-slipped ware, grey ware {*c.* sixth-third century BC), red ware (early to medieval period), black-and-red ware (medieval), black ware; fragments of bangles, blade, architectural and sculptural remains *(c.* seventh century AD to medieval period), *sarvatobhadra Krishna lila stambhas (c.* thirteenth century)
Barkachha Kalan	Red ware (Gupta to medieval period), iron-slag, *glazed* ware, architectural remains of medieval period and a stone temple of eighteenth-nineteenth century

Village/Site	*Nature of remains*
Basuhi	Medieval Brahmanical sculptures
Buili Pandey	Stone celts
Bihari	Red ware (medieval)
Bishesharpur	Red ware (medieval)
Chandaipur	Red ware (medieval), stone sling-ball, stone temple of *c.* eighteenth century
Chapor Kalan	Red ware (early medieval), brickbats and medieval Brahmanical sculptures
Chaura	Stone *kolhus* of eighteenth-nineteenth century with some Devanagari inscription
Cheruiram	Architectural remains of a medieval period
Chindlikh Dube	Medieval Brahmanical sculptures and architectural remains, a stone-slab with Devanagari inscription
Chindlikh Gaharwar	Medieval Brahmanical sculptures and architectural remains
Chintamanpur	Red ware (medieval)
Chitpur	Medieval Brahmanical sculptures
Deokhara	Red ware (medieval), black ware, stone *kolhus* and a stone-slab in well with Devanagari inscription
Deori	Remains of a brick temple (medieval), miniature shrine of stone, medieval Brahmanical sculptures
Dunaiya Dube	Red ware (Gupta to medieval period), grey ware in coarse fabric (medieval)
Dunaiya Pande	Red ware (late Kushan to medieval period)
Dubra	Remains of a brick temple having carved bricks, medieval Brahmanical sculptures and architectural remains
Gangawat	Red ware (Gupta to medieval period), black ware, stone sculptures and architectural remains *(c.* seventh century AD to medieval period)

Village/Site	***Nature of remains***
Gopalpur	Medieval Brahmanical sculptures and architectural remains
Harihar pur	Architectural remains of medieval period Red ware
Hira patti Hurua	(medieval), architectural remains of medieval period Red ware
Indarpur	(Gupta to medieval period)
Indiparbat pur	Red ware, grey ware, black-slipped ware, black ware (historical to medieval period)
Jasowar	Architectural remains of ruined stone temples datable to ninth-tenth century and medieval Brahmanical sculptures
Jignauri	Medieval Brahmanical sculptures, architectural remains, votive tank of stone, *sarvatobhadra Krishna lila stambhas* (medieval)
Kantit	Red ware (Gupta to medieval period), beautiful Baoli of stone, datable to eleventh century and architectural remains
Khajuri	Medieval Brahmanical sculptures and architectural remains
Kusaha	Stone *kolhus* of eighteenth-nineteenth century Red ware (Gupta to medieval period)
Lonhdi Kalan	Red ware (medieval), stone *kolhus,* eighteenth-nineteenth century
Mahuwari	Medieval Brahmanical sculptures and architectural remains
Mahewa	Medieval Brahmanical sculptures, architectural remains, votive tanks of *c.* nineteenth century
Masari	Stone *kolhus* eighteenth-nineteenth century
Meoli	Red ware (early medieval period), black ware and medieval Brahmanical sculptures
Nakahra	Red ware (medieval), bricks measuring 19 X 18 X 6 cm and medieval Brahmanical sculptures
Natwa	Red ware (medieval), medieval Brahmanical sculptures, *sarvatobhadra Krishna lila stambha* (medieval)
Nawaon	

Village/Site	*Nature of remains*
Nauhan	Red ware, Brahmanical sculptures and architectural remains (medieval)
Pacher Dube	Medieval Brahmanical sculptures, stone *kolhus*
Pacher Misir	Stone *kolhus*
Pandra Hanuman	Rock-cut engraved picture along with an inscription in Gupta Brahmi characters, stone celts and *kolhus*
Rai pur Pukhta	Medieval Brahmanical sculptures, stone vase decorated with *ghata-pallava,* architectural remains, carved stone pillar with Devanagari inscription, remains of a brick temple of medieval period, *sarvatobhadra Krishna lila stambha* of medieval period
Sinhar	Red ware (Gupta to medieval period,) medieval Brahmanical sculptures and architectural remains
Sirsi Baghel (Agar)	Medieval Brahmanical sculptures and architectural remains, *sarvatobhadra Krishna lila stambha*
Semra Belauan	*Navagraha patta* (medieval)
Shahpur Chaunsa	Red ware, grey ware, black-slipped ware (historical period)
Tand	Red ware (Gupta to medieval period)

81. EXPLORATION IN DISTRICT PITHORAGARH

Under the sporadic survey of Naini-Patal village near Pithoragarh, a hoard of five copper implements were brought to light. These objects are in the shape of hatchets *(parasu)* or anthropomorphic object and probably belong to Copper Hoard-Culture, approximately datable to the first half of second millennium BC. These copper objects were collected and displayed in the Government Museum, Almora.

A stone image of Lakshmi-Narayana belonging to *circa* twelfth century AD was located in village Chopra near Thai of Didihat tehsil. Stone sculptures of Narasimha. Balrama and Seshayi-Vishnu datable to eighth-ninth century and Lima Mahesa of *circa* fourteenth century were found in a temple of village Talli-Mirthi near Didihat. Two stone images of standing Parvati and Uma-Mahesa belonging to early medieval period lying in a modern temple of Purana-Thal are the other noteworthy finds.

82. EXPLORATION IN DISTRICTS UTTARKASHI AND DEHRADUN

In continuation of the last year's work *(1998-99.* pp. 213-216). B.P. Badoni. assisted by

Plate 134



Pakhanna: terracotta ring-well

R.C. Dhasmana, of the Pauri Unit of the State Archaeological Department, the Government of Uttar Pradesh, under the direction of Rakesh Tewari, undertook exploration of about ninety villages in Tons Valley and a number of temples dedicated to Mahasu, Kaunl, Sherkudia, Siva, etc. were documented. The temples of the villages Bhutanu, Chenwa, Kuna, Radii, Mandol and Arakot are noteworthy. These temples consist of *garbhagriha, mandapa* and *ardha-mandapa* in plan, highly elevated *sikhara* and wooden *chhattravali.* The carved motifs on their wooden door-jambs and flanks are notable. These motifs include the depiction of Ganesa, Sarasvati, Dasanana, geometric designs and Naga-mithunas.

83. EXCAVATION AT PAKHANNA, DISTRICT BANKURA

In continuation of the previous year's work *(J 997-98,* pp. 200-203), the Department of Archaeology, University of Calcutta, resumed excavation at Pakhanna, under the supervision of Chitrarekha Gupta, assisted by Mallar Mitra, Asok Datta and other staff members of the Department.

Besides imparting training in the field archaeology to the post-graduate students of the Department, some problems associated with the site induced to carry excavation at Pakhanna this year also. However, small-scale excavation was conducted.

During this year three trenches (6 X 6 in) were taken up in the Kalyanpur area, dug earlier and Trenches DY-14 and EY-14 supported the earlier proposition that black-and-red ware using people did not settle down in this area of Pakhanna instead the settlements started in this area from the Maurya-Sunga period.

The available evidence from the cuttings which continued down to 2.34 m *viz.,* pottery and antiquities indicate a tentative chrono-cultural frame-work for this area of Pakhanna, which is as under.

In Period I *(c.* fourth-first century BC). the settlement was limited with restricted number of potsherds and antiquities, characterized by black-polished ware, bone tools, terracotta figurines and beads.

In the succeeding Period II (c. first-third century AD) there is an appreciable change noticed in the deposits; marked by the presence of stamped pottery, Rouletted ware, black-slipped ware, red ware, terracotta figurines, beads of semiprecious stones and clay, copper ornaments, etc.

Period III *(c.* fourth-seventh century AD) is characterized by the presence of moulded pottery, red and grey wares, stone beads, terracotta balls, beads, toy cart-wheels and figurines.

In Period IV (c. eighth century AD onwards), the site was inhabited by the Pala-Senas and a mud floor was exposed in Trench EY-14.

Two terracotta rings of a ring-well have been traced in Trench EY-14. each measuring 21 cm in height and 75 cm in diameter (pi. 134).

In another Trench (A 1). a pot-burial was found placed in an oval pit. This conical hand-made pot of pale red colour, was inserted in a hole dug out at the center of the pit. Unfortunately, the upper part of the jar is damaged. The bottom of the jar is found at a depth of 2.14 in with its top located at a depth of 1.24 m from the surface level. Thus, the present height of the broken jar is 90 cm. The diameter of the jar is 80 cm. The jar

yielded the evidence of secondary burial, containing mortal remains of human being. Mandible, occipital bone and a few other bone fragments recovered from the jar were sent for testing-the report is awaited. A pale red perforated jar was also found along with it. A few pieces of black-slipped ware, Rouletted ware, red ware recovered from the packing material. Digging continued down to 2.34 m.

84. EXPLORATION IN DISTRICT BANKI RA

Subrata Chakrabarti of the Department of Ancient Indian History, Culture and Archaeology, University of Visva-Bharati, carried out exploration in Bankura, in south Bengal. This region is well known for its rich cultural heritage but its northern fringe where the lateritic uplands meets the deltaic plain remained terra incognita so far as either Palaeolithic or megalithic archaeology is concerned. In fact in 1992 a few microlithic artefacts and a small pebble-chopper were found from the bed of Kuasuta, which drains the area, but only in this season's exploration geological and archaeological context of these artefacts could be known. These were derived from the two sites located close to Chak Dhoyakure (23° 15 N; 87° 27' E) and Manipur (23° 05 N: 87° 00' E), situated about 4 km south-west and 2 km south of Dhansimla respectively.

At Chak Dhoyakure, about half a km upstream from the north of the village, the Kuasuta river, on its south bank revealed the following:

IV. Pebble-conglomerate member
III. Sandstone member
II. Cobble conglomerate member
I. Horizontally bedded clay stone member

From the archaeological point of view, the pebble-conglomerate member is important for a pebble-chopper was found embedded in the upper half of the gravel with a ferruginous matrix and lower half of the lateritic capping. A few tools (burins, waste flakes, etc.) were also found in the gully erosion from this locality.

In another gully, about a quarter km north from the Locality I, on the south bank of the Kuasuta, a scatter of artefacts, measuring 5 x 2 m, were recorded. The geological context of their archaeological horizon here is yet to be ascertained. However, the matrix in which these artefacts are found to lie consists of rounded to sub-rounded pellets of laterite and granular quartz pieces of various sizes. The artefacts show signs of weathering but some specimens are quite fresh.

The artefacts include burins, knives, scrapers, borers, lunates, flakes and wastes. The raw material employed are quartz, quartzite, chert, carnelian, fossil wood, etc. The assemblage may be classified as belonging to the Upper Palaeolithic-mesolithic transitional industry.

At Manipur, close to an isolated abandoned temple, there occurs a lateritic outcrop. Microlithic artefacts were found on the surface of this outcrop which had come up due to erosion. The artefacts include lunates, triangles, points, borers, notches, blades, micro-burins, arrow-heads and wastes. The raw material employed are quartz, chert and fossil wood etc.

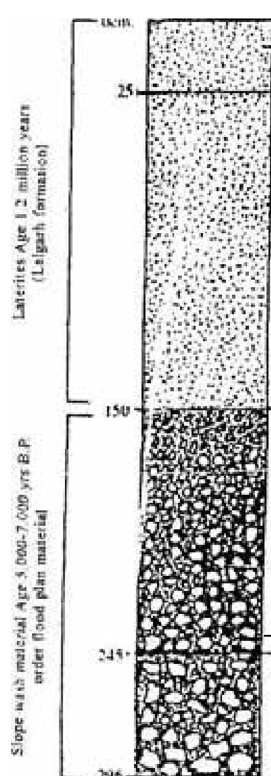
The Manipur assemblage may be classified as belonging to the mesolithic tradition.

85. EXPLORATION IN DISTRICT BIRBHUM

In continuation of the previous year's work (*1998-1999,* pp. 218-219), Subrata Chakrabarti of

the Department of Ancient Indian History, Culture and Archaeology, University of Visva-Bharati, re-explored the area around the Upper Palaeolithic/mesolithic site of Paruldanga (23° 41' 15" N; 83° 43' 20"E). As the mesolithic and Upper Palaeolithic assemblages were collected from the site, the aim of this season's exploration was to work out a detailed stratigraphical relationship, on the one hand, between the blade-let industries, designated as mesolithic I and II, and, on the other hand, a blade-based leptolithic industry of the Upper Palaeolithic times from Paruldanga. Within the extent of the Paruldanga site, four sedimentary samples were collected and analyzed and their sedimentological properties and description in relationship with the industries they incorporate are presented below:

Depth in cm — *Lithological Description*



Yellowish brown to reddish brown silt and fine grained sand with grits of quartz and chert. (Sample No. Pd-4)
(Slope wash material)

Yellowish red silt and medium grained sand with iron-oxide granules and grits of rock fragments constituting mainly of vein quartz and chert; volume of iron-oxide granules increases gradually with depth.
(Sample No. PD-3)
(Slope wash material)
(Age: <5,000-7,000 years)

Old Surface with Mesolithic & Upper Palaeolithic tools above & below respectively ~~
(>12,000 years B.P.)

Zone of nodular Iaterite; dark red coloured individual iron-oxide nodules fused together giving rise to a hard compact layer; unaltered grits of vein quartz, quartzite and chert are present; size of individual iron-oxide nodules gradually increases towards bottom.
(Sample No. PD-2)

Light red coloured pebbly Iaterite zone; pebbles of iron-oxide nodules; vein quartz, quartzite, chert are embedded within iron-oxide rich coarse grained sandy matrix; pebbles are subrounded and with varying diameter ranging from 2 cm to less than a cm.
(Sample No. PD-1)

Uptil now, this is the only area in Birbhum wherefrom a stratigraphical succession of a gradual development of blade industries from Upper-Palaeolithic to mesolithic was recorded and, therefore, soil profile from six other localities were also collected to discern the palaeoenvironment and palaeoecology of the Late Quaternary hunting/gathering populace.

The six soil samples were collected at a distance ranging from 70 km north of Paruldanga to 15 km west of it. The depth of the profiles vary between 10 m and 4 m. The stratigraphical sequence from Nalhati (70 km north). Rampurhut (60 km north), Rajnagar (50 km north-west), Suri (30 km north-east), Labpur (20 km east) and Illambazar (15 km west), although follow a generalized order to red, brown, black and grey clay.

Plates 135-136



135



136

Rajpat: 135, *brick-built well with rectangular platform and* 136, *eastern fortification wall*

albeit the brown clayey layer sometimes irregular, the thick black clayey layer between 4 m and 2 m, with its ubiquitous presence could suggest a favourable depositional conditions for autochthonously thickly forested constituents of the region during the Late Quaternary.

86. EXCAVATION AT RAJPAT MOUND, DISTRICT KOCH BIHAR

In continuation of the previous years' work (*1998-99,* pp. 219-221), Kolkata Circle, of the Survey, under the direction of S. B. Ota, assisted by T.J. Baidya, A.K. Bandyopadhyay, T.J. Chakraborty, S. Maiti, S.K. Ghosal, A.K. Tiwari, P.K. Naik, M.C. Joshi, K. Srimani, T. Datta, Rajat Nath, P.N. Biswas, T. Sahana, P.Biswas and S.Sarkar, resumed excavation at the mound of Rajpat with a view to exposing and examining the structural alignment of various phases in relation to the cultural periods at different parts of the mound as well as its adjacent area and outside the citadel area.

In the mound proper, work was done in the central portion and its eastern part (RPT-2), comparatively lower terraced-mound adjacent to the east of the main mound (RPT-3); the tank adjacent to the north-west of the main mound RPT-4 and the southern fortification wall and adjoining sandy area to the south RPT-5. Excavation was also conducted outside the mud-rampart wall to the south-west of the mound in Site-2 area.

In RPT-2, the remains of an incomplete stone temple, brick foundation of a long enclosure wall, remains of mud wall of a house, guardroom attached to the eastern fortification wall belonging possibly to Khen period were exposed. The brick-lined huge circular wells with rectangular brick-built platform have also been exposed during the course of excavation (pl. 135). These wells built in earlier period were in use till the end of the settlement.

In RPT-3, the inner eastern fortification wall was exposed to a length of 21.10 m with a very fine facing (pi.136). It is 7 m wide and exposed height is 4.80 m. An adjoining rectangular platform and subsidiary wall which co-relates the eastern outer fortification wall (not yet exposed) and the inner fortification wall of both earlier (Pala) period and later (Khen) period were also exposed. Interestingly, the fortification walls built in earlier period were also found repaired, renovated and reused raising its height in Khen and Koch periods.

In RPT-4, a Royal Tank with its two bathing *ghats* on eastern and western sides was exposed approximately measuring 44.80 m x 34.20 m. The vertical inner sides of the banks were studded with stone blocks. On the edge of the banks brick walls were constructed and the top of the walls was rammed with brickbats. This tank according to the tradition was meant for the king and his ladies.

In RPT-5, a portion of the southern fortification wall with its frontal facade and two adjoining brick-built walls, running parallel to each other, were exposed. These two walls run further south and possibly in-between these two walls, there was approach road leading to the main entrance of the fortification of Rajpat.

The characteristic features noticed in these structures could be summed up as under :

Mortar used was mud in all the period; in the earlier period, full size bricks on the facing and in the core; perfect alignment in the construction of early period; no regular bonding method was traceable in the construction; in the later phases of construction there was use of bricks mostly of earlier period; use of wood for the superstructure in the last two phases; in the later phase, stones were used as building material:

Plates 137-138



137



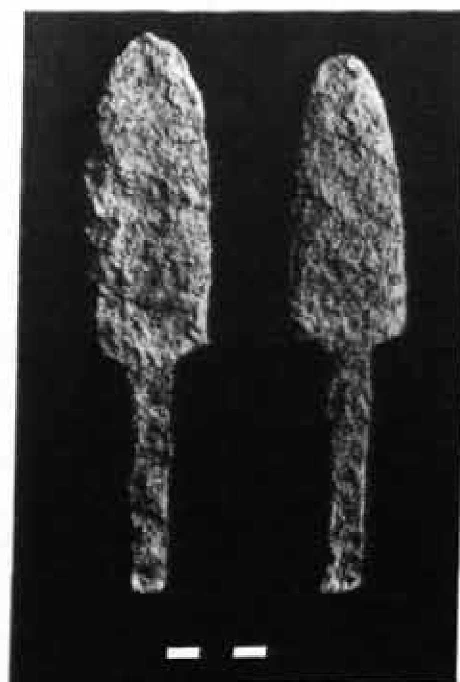
138

Rajpat: 137-138, *fragmentary stone sculptures*

Plates 139-140



139



140

Rajpat: 139, *silver coin of Sultan Gias-ud-din Azam Shah and* 140, *iron spear-heads*

occurrence of projected offsets for massive and higher structures on the facades in order to break monotony of plain wall to enhance beauty to the shades and lastly no uniformity in the size of bricks for structures with their dimension varying from period-to-period.

No remarkable change could be noticed in the pottery found during digging and red ware of various shades, grey ware, black ware with varieties of shapes, mostly turned on wheel along with a few hand-made and moulded specimens were collected. Dark red, chocolate and grey slips were noticed with a variety of shapes comprising vases, bowls, basins, dish, lids, *handi,* miniature pots, beaker, etc. A few buff-coloured sherds possibly made of Kaolin were found in the excavation which possibly bear distant relationship with "Ambari ware" assignable from the seventh to the twelfth century.

Quite a good number of fragmentary stone sculptures found here belong stylistically between the ninth and twelfth century (pls. 137-138), showing and influence of Pala-Sena school of art. Terracotta objects include animal figurines, mother goddess figurines of ageless variety, terracotta balls, beads, etc. Mention may also be made of a decorative terracotta plaque depicting a cow and sucking calf.

A silver coin (pi. 139) of Sultan Gias-ud-din Azam Shah (of Gour) who attacked Kamarupa in the fifteenth century AD was recovered during excavation. Other coins mostly of copper belong to the East India Company.

The metal objects include different types of nails, chisels, clamps, dowel pins, spatula, arrow-heads, spear-heads (pi. 140), sickle, rings, chain of iron, etc., nails, rod. bangle, *ghungru,* etc. of copper belong mostly to the Khen period. One bone point was found from a considerable depth with a triangular cross section.

87. EXCAVATION AT JAGAJJIBANPUR DISTRICT MALDA

The Directorate of Archaeology and Museums, the Government of West Bengal, resumed excavation at Tulabhita mound in Jagajjibanpur (25° 02' 24" N; 88° 22' 82"E), under the direction of Amal Roy, assisted by Prakash Maity, Sumita Guha Sarkar, Dilip Dutta Gupta, Subir Sarkar, Gautom Sarkar, S.K. Ganguly. Tapas Patra, Mintu Chakraborty and Kamal Mondal. During the previous year front and rear porch of the entrance-complex was unearthed. Thus the objective of the current season's excavation was to expose further i) entrance-complex in eastern part and ii) sanctum-complex in western part of the Buddhist Monastery "Nanda-dirghi" belonging to the ninth century AD during the time of Shri Mahendra Pala Deva of the Pala dynasty. In the eastern part of the mound in Trench F3, F4, F2, Fl, Gl. G2, ZF1, ZG1, yielded the easternmost extension of the pylon or the massive staircase with side walls but structure exposed so far is too much damaged due to brick robbing. The superstructure is also found missing in most cases. Further digging was continued to expose the complete plan of the structure. The average depth of the referred trenches is 80 cm with three layers of deposition and the average thickness of layers ranged from 10 to 15 cm (layer 1), 30 to 40 cm (layer 2) and 30 cm (layer 3). The layer (1) consists of ashy deposit, dumped by the local inhabitants, layer (2) consists of thick semi-compact soil, yellowish in colour and mixed with brickbats and potsherds and layer (3) is the sealing layer of the structure. The third layer is more or less compact in nature with full of brickbats and huge potsherds.

The northern half of the Trench F3 was taken up for digging to trace the outer wall, adjacent to the entrance. Even at 1 m depth, there was no trace of wall but a large number of brickbats found at

Plates 141-142



142



141

Jagajjibanpur: 141-142, *terracotta plaques*

Plates 143-145



144



143



145

Jagajjibanpur: 143, *terracotta plaque showing deer and* 144-145, *terracotta sealings*

the northwestern comer indicated the presence of wall at probably a lower level.

In Trench F2, the outer wall adjacent to the staircase, was exposed in the eastern half of the trench. The wall is badly damaged. So far eleven courses of bricks were traced. Further digging might reveal some more courses of bricks. The face of the pylon was partly exposed in this trench. So far ten courses of bricks could be noticed.

In the western part of the mound, digging was done in the Trenches XD2, XE3, XF1, XF2, YD1, YE1, and YF1. During the first phase, exposed fully the outer wall of the sanctum. Eighteen courses of bricks in the western side, twenty-two in the northern side and sixteen in the southern side were exposed upto the plinth level. The western face of the wall of the sanctum measures 6.88 m, the northern face of the wall of the sanctum measures 9.40 m and the southern face of the sanctum measures 9.40 m. The existing height of the sanctum wall (externally) is 2.25 m in the north, 1.65 m in the west and 2.05 m in the south.

The width of the circumbulatory pathway exposed all around the sanctum is 1.50 m in the west as well as in the north and 1.44 m in the south. For the pathway the fine alluvial soil was used. A massive wall is found running all around the sanctum, leaving the space of *pradakshina-patha.* The width of this wall is 3.08 m. It is badly damaged due to random brick-robbing in the past. The inner face of the wall facing towards east, i.e., the western part of the sanctum, measures 10.50 m (north-to-south) and the inner face of the wall facing towards south measures 14.28 m (east-to-west).

A small control pit was taken up at the northwest comer *of the pradakshina-patha* with a view to exposing the remaining courses of bricks of the plinth of the sanctum as well as the outer wall around the sanctum. So far eight courses of bricks of the sanctum and eleven courses of bricks of the outer wall (northern side) were unearthed. The average size of bricks is 30 X 23 X 6 and different sizes of bricks were used (including brickbats) for the core of the structure. For veneering however, the bricks were used for strengthening as well as for a better view.

Terracotta plaques showing single figures were recovered from the debris (pls. 141-143). Most of them are intact and well preserved. The plaques were used for decoration of the outer wall-surfaces at its base parts above the base-mouldings of the designed brick-panel. Among the plaques, those with the images of Agni, Varuna, Manjusri, etc. are important. Besides a large quantity of potsherds, terracotta seals and sealings (pls. 144-145), beads of terracotta and semiprecious stones, hopscotch and iron nails were also collected.

A general analysis of pottery from the different layers show no major variation. The pottery assemblage can broadly be divided into three main groups; the first group comprising the dull red and buff ware, constitute the predominant types of the period. The common shapes are *handi,* jars, bowls, shallow bowls, etc. Besides lids, large-sized vessels, lamps and a few spouts were also recovered. Slip is mainly applied on red ware.

In the second group, there are grey ware potsherds with *handi,* cooking vessels, shallow bowl and basins which form the common type.

The third group constitutes a small amount of black sherds with shapes like narrow-necked jar, *handi,* lid, lid-cum-bowl, frying-pan, etc., with occasional use of slip on some of the sherds.

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II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS'

ANDHRA PRADESH

1. KAKATIYA INSCRIPTION, I)DUDDEDA, DISTRICT MEDAK

This inscription engraved on a slab kept in the compound of Svayambhulingesvara Temple, outside the village, is in Telugu language and script. Dated in Saka 1218 {AD 1296) and belonging to the reign of *mahamandalesvara* Pratapa Rudradeva of Kakatiya family, it records the gift of eighty *madas* per year out of the tax-income from taxes like *addavatta-sumkamu* of the village to god Svayambhudeva at Duddida by Madayaraddi, son of Nachayaraddi who was the lord of Panungapura.

2. KAKATIYA INSCRIPTION, KONDAPAKA, DISTRICT MEDAK

This inscription in Telugu language and characters, engraved on a blackstone slab kept in front of the Siva temple outside the village belongs to the reign of Kakatiya king Rudradeva. Dated in Saka 1116 (AD 1194), it states that thirty soldiers of archery-wing *(ekatalu)* got installed the god Rudresvaradeva at the village Kondapaka and made grant of twelve *marutur* of wet lands located near the tank named Dakshina-Ganga for the maintenance of lamps *nanda-divve* and *nanda-dipa* in the temple, for the merit and well-being of the king.

ASSAM

3. STONE INSCRIPTION, DUBARANI, GOALPARA, DISTRICT KAMRUP

This inscription on a stone slab, preserved in the State Archaeology Department, Guwahati, written in Sanskrit language and late Brahmi characters can be assigned to the sixth century AD on palaeographical grounds. It records the creation of a permanent endowment *(akshaya datti)* by Sri Vasundhara-varmma (pi. 146).

4. ROCK INSCRIPTION, GUWAHATI, DISTRICT KAMRUP

This record, engraved on a big granite boulder, belongs to the reign of Ahom king Sivasimha and is dated in chronogram *Veda-Visikha-Vedanga-Sasidhara,* i.e., Saka 1654 (AD 1732). The record is in Sanskrit language and Assamese script. It records the construction of a gateway *(dvara)* along with a rampart *(pranchi)* measuring one hundred and fifty-two *dhanus* and

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Information from: 1-16, 23-30, M.D. Sampath, Director (Epigraphy), Sanskrit & Dravidian Inscriptions, Mysore, assisted by K.M. Bhadri and M.J. Sharma, T.S. Ravishankar, Jai Prakash, C.A. Padmanabha Sastry, N.N. Swamy and D.M. Nagaraju, S.Nagarjuna, S. Swaminathan and K. Karuppaiah, and S. Rajavelu of the Epigraphy Branch, Mysore, Northern Zone, Lucknow and Southern Zone, Chennai; 17, 20-22, Department of Archaeology, Government of Tamil Nadu, Chennai.

Plate 146



Dubarani: inscription on a stone slab

a moat *(parikha)* measuring two hundred and twenty-two *dhanus* for Pragyotishapura and a rampart along with a moat at the site. The materials used for the construction of the rampart were earth, stone and bricks *(mridsila ishtakadi). (contra-Prachya Sasanavali* by Maheswar Neog, No. 28).

5. INSCRIBED STONE SCULPTURE, TEZPUR, DISTRICT SONTTIPUR

A sculptural panel in stone, kept in the Tezpur Museum, bears an inscription in Sanskrit language and proto-Bengali characters of about the twelfth century AD. Engraved below the sculptural representations of male figures are the names Halva, Dusana and Trishira.

6. TWO FRAGMENTARY INSCRIPTIONS FROM KANAVI, DISTRICT GADAG

Of these two inscriptions in Kannada language and characters, the first one found engraved on a broken stone kept in front of Dyamavva Temple in the village, belongs to the reign of Amoghavarsha of the Rashtrakuta family, ft refers to certain Indapayya as ruling the *nadu.* While the second inscription, being a hero-stone found in a field in the village, refers to the rule of Nityavarsha (Indra III) and Indapayya as administering over Belvalanadu. The chief Indapayya figuring in both the inscriptions seems to have served as a chief under the two Rashtrakuta kings mentioned above.

7. HERO-STONE INSCRIPTION, NILAGUND, DISTRICT GADAG

This inscription, engraved on a stone set up inside the Hanuman temple, in Kannada language and characters refers to the death of a certain Ammaniga, younger brother of Chandaka in a battle fought in front of one hundred and twenty *mahajanas* of Nirgunda when Bemara Chandiyana of Mulugunda attacked the village. This hero-stone is stated to have been set up in memory of the deceased by the *mahajanas* and the brother of the deceased hero. It gives the Saka date as 807 which, along with the given cyclic year Visvavasu, corresponds to AD 885. This date falls in the reign period of the Rashtrakuta king Krishna II.

8. CHALUKYA INSCRIPTION, NILAGUND, DISTRICT GADAG

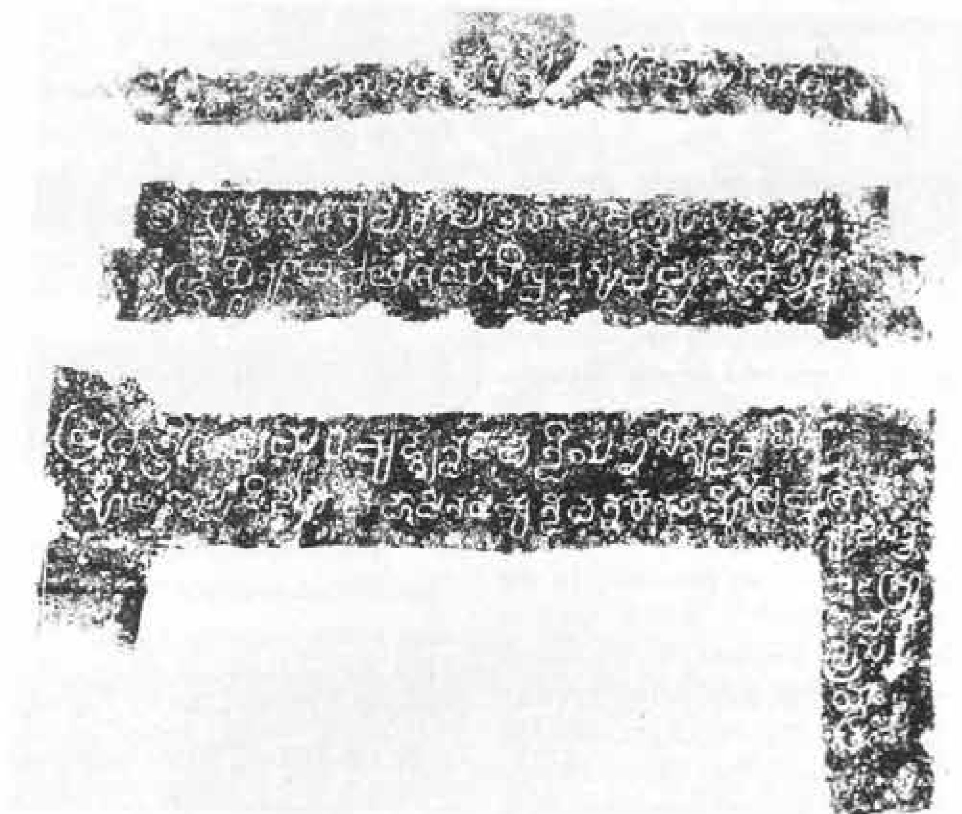
This Kannada inscription, partly damaged and worn-out and engraved on a slab lying by the side of the Hanuman temple (pi. 147), belongs to the reign of the Chalukya king Tribhuvanamalla (Vikramaditya VI) and is dated in the 32nd Chalukya-Vikrama year (AD 1108). It records the grant of some land and three boats *(doni)* for the food offerings and maintenance of a perpetual lamp in a temple (name lost) in the *agrahara* village Nirgunda, after laving the feet of a certain ascetic (name not clear) by *mahapradhana-senapati-dandanayaka* Biddarasa. The inscription eulogises a certain *pradhana-senadhipati dandanayaka* Chavundamayya.

MADHYA PRADESH

9. BRAHMI INSCRIPTION, BILASPUR, DISTRICT BILASPUR

This inscription, preserved in the State Museum, Bilaspur, is m Prakrit language and

Plate 147



Nilagund : Chalukya inscription on a stone slab

Brahmi script (pi. 148). On palaeographical grounds the record can be assigned to the second century AD and it records probably, the collective gift made by Isinaga and others.

10. COPPER PLATE INSCRIPTION, BILASPUR, DISTRICT BILASPUR

This charter, now preserved in the State Museum, Bilaspur, is written in Sanskrit language and in Nagari characters. Dated in Kalachuri year 913 (AD 1161) it belongs to the reign of Jajalladeva II of the Ratanpur branch of the Kalachuri dynasty. It records the grant of the village Khuda in Evadi-mandala by the king Jajalladeva to a Brahmana named Rajasimha, son of Rani and grandson of Jaso of the Atreya family. The gift was made on the occasion of a solar-eclipse in the month of Magha. The charter was composed by Dharmmasimha, son of Vatsaraja and engraved by Chandraka.

11. COPPER PLATE INSCRIPTION, MALHAR, DISTRICT BILASPUR

A stray copper-plate, presently in the possession of Gulab Singh at Malhar, bears an inscription in Sanskrit language and box-headed characters of about the sixth century AD. It belongs to the reign of Mahasivagupta, son of Sri Harshagupta of the Panduvamsi family of Kosala and records the grant of lands included in *Dani-bhoga* for the Brahmanas. The order was addressed to the royal officers and local residents.



12. STONE INSCRIPTION, BISHNUPUR, SUB-DIVISION IMPHAL

This inscription is on the bank of a tank *(pukhri)* at Bishnupur. It is dated in Saka 1816 (AD 1894) and written in Bengali language and proto-Bengali script. The record refers to *Adbaita Parivar* (i.e., Advaita sect) brahmana-amsamga and sri-vaishnavi. This record possibly belongs to the reign period of Churchand Maharaja though his name does not figure in it.

13. STONE INSCRIPTION, KHOIBU MARING, DISTRICT TENGNOPAL

This inscription is in old Manipuri language and Meitei script of the seventeenth century AD. It registers the proclamation of the king Khagemba for the protection of sacred places of goddesses, slaves, animals and people. It also refers to the worship of a goddess by Chingthon Paikomba.

ORISSA

14. INSCRIPTION, BHUBANESWAR, DISTRICT KHURDA

Engraved on a stone slab, this inscription in Sanskrit language and Nagari characters of about the ninth century AD records the Buddhist formula *ye-dharmma hetu prabhava,* etc.

15. INSCRIPTION, UDAYAGIRI, DISTRICT JAJPUR

Engraved on a stone slab and datable to the ninth-tenth century AD, this fragmentary inscription, in Sanskrit language and Nagari characters, records some Buddhist *dharani.*



16. TWO CHOLA INSCRIPTIONS, SARAPPANANCHERI, DISTRICT KANCHIPURAM

One of these Tamil inscriptions is engraved on the west and south wall of *jagati* portion of

Plates 148-149



148



149

Malhar: 148, *stone inscription;* 149, *Vettamangalam : Kongu Chola inscription*

a ruined Siva temple and belongs to the fourth regnal year (AD 1074) of the Chola king Tribhuvanachakravattigal Sri Vira Rajendra (Kulottunga I). It refers to the gift of four *palankasu* for maintaining the *sandhi-lamp* in the temple of Bhimisvaram-udaiyanayanar at the village Peruvanjur of Velima-nallur-nadu, a sub-division of Urrukkattuk-kottam in Jayankonda chola-mandalam by a lady namely Kannanalvar, wife of Amanpakka-kilan Sendamaraikkannan, a resident of Urattur *alias* Salikkakulakalanallur in Konadi-nadu of Senkattuk-kottam. This gift was entrusted to the temple Brahmana Tiruvegambhamudaiyan son of Vellan Tankinan *alias* Gangadhara bhattan of Bharadvaja *gotra* who had a *kani* right in the temple.

The second inscription at the same place and belonging to the 7th regnal year (AD 1223) of Raja Raja (Raja Raja III) refers to a gift of four palankasu for burning a *sandhi-lamp* in the same temple referred to above by a lady Sivalogam Vadaiyal, daughter of Umaiyalvi belonging to the harem of Pillai Nilagangaraiyar. The gift amount was entrusted to the temple Siva-brahmana Umaiyan *alias* Panmahesvara-bhattan of the temple, who was the son of Kampa-bhattan belonging to Bharadhvaja-gotra and had *kani* rights for ten days in thirty days' cycle *(muppadu-vattam).*

17. TAMIL INSCRIPTION, DISTRICT KANCHIPURAM

This inscription records the construction of a sluice in the tank by a Queen Kongaraiyar Deviyar of Kongaraiyar Kallapperumanar. The inscribed slab, located near the tank of Kallattur kongarai in Maduranthagam taluk, is assignable on the basis of palaeography to the eight-ninth century.

18. OIL PRESS STONE INSCRIPTION, VELLIYANAI, DISTRICT KARUR

This label inscription, engraved on the oil-press stone lying in front of the Mariyamman Temple at the village, refers to the oil-press *(sekku)* set up by *Ainnurruvar* (a mercantile group) to the god Somur Mahadeva. Palaeographically this inscription can be assigned to the eighth-ninth century AD.

19. KONGU CHOLA INSCRIPTION, VETTAMANGALAM, DISTRICT KARUR

Engraved on the west wall of the Pushpavananatha Temple in the village, this inscription (pi. 149), in Tamil language and characters, is dated in the 14th regnal year (AD 1287) of the Kongu Chola king Vikrama Choladevar. It refers to the gift of one *Palansalagai-achchu* for burning a *sandhyadipa* (twilight lamp) in the temple of Vettamangalattu-nayanar Purpavanamudaiyar by one Silampan Senchiruppillai of *Puluva Vettuvar* community, a resident of southern hamlet *{ten chert)* of the village Vettamangalam, in the division of Kilanga-nadu, This amount was entrusted to the temple brahmana for maintaining the said service.

20, INSCRIPTIONS OF MERCHANT GUILDS, DISTRICTS KARUR, KANCHIPURAM AND TRICHI

An inscription of the ninth century was found at Kannimar Temple, west Nangavaram of Kulithalai taluk in Karur district. It mentions a garden called Irunurruvar was created by a person called Bhavathronasarman, in the name of Valanjiyar Irururruvar,

Ten inscriptions were copied from the temple of Pushpavana Iswara of Vettamangalam in Karur taluk of the same district, which all belonged to the thirteenth century.

A single word "Innurruvan Kulam" inscription was found with usual symbols of the merchantile guilds, near the tank of Polichalur of Sriperumbudur taluk in Kanchipuram district.

Another inscription at T. Kattaiyam of Kilakurichi in Trichi district records that the village of Senthamaraikkannanallur was given to one to the Bhauddhappalli at Veeradhavalam as Pallichchandham. This is the first reference which gives the specific information of a Buddha Palli, probably a monastery with a temple of eleventh-twelfth century. This inscription is also engraved with the symbols of Merchantile guild.

21. COPPER PLATES, DISTRICTS KARUR AND MADURAI

A copper plate owned by one Perumal of Melnangavaram, Kulithalai taluk of Karur district is in Telegu script and language, records that during the Vijayaranga Chokkanatha Nayaka, the son of Veerappa Nayaka and grandson of Chokkanatha Nayaka's reign, allotment of a piece of land was made to an individual who in turn was to supply salt to celebrate the Navaratri festival.

A copper plate (AD 1760) acquired from one Muththalahan, a trustee of Ramalinga Swamigal Madalayam at Arappalayam near Madurai records the collection of *a pon* (gold) per wheel (potter's wheel) as tax and also the privileges which were given to the potters.

22. TAMIL BRAHMI INSCRIPTIONS, DISTRICT TIRUNELVELI

Two archaic Tamil Brahmi inscriptions found in the natural cavern and on the slopes of the Pothigai hill, locally called as Rajaparai and Nilapparai at Ayyanarkulam, situated north of Sivanthipuram in Ambasamudram taluk in Tirunelveli. On the basis of palaeography, these inscriptions belong to the first century AD. Of the two inscriptions, the first one noticed on the side of the rock bed, used by the Jaina monks, reads as *"palli seyvittan kadigai kovin makan perunkunran."* It refers to the rock bed which was carved by one Perunkunran, the son of Kadigaikon.

The second inscription found on the opposite rock reads as *"Gunavin lingo seypita palli"* refering to Kunavinlingo by whom was carved this rock bed.

23. TAMIL INSCRIPTION, PANNIRANDU: PUTTUR, DISTRICT TIRUVANNAMALAI

This Tamil inscription, engraved on the south *kumuda* of the *mukha-mandapa* of the ruined Siva temple in the village and dated Saka 1343 (AD 1421-22), refers to the gift of some land, two house-sites and some tax concession from the village income to the god Vidyapati Isvaramudaiya Nayanar of the Village Puttur. This gift was made by the people of *agaram* Puttur.

24. HERO-STONE INSCRIPTION, DKVIKAPURAM (NEAR MADANUR), DISTRICT VELLORE

This Tamil inscription engraved on a hero-stone belongs to the reign of the king Parthivendradipanmar. Dated in his 14th regnal year, it refers to the setting up of a hero-stone

(kal-idu) for one Mukkan son of Sellaiyan Adigar Kotta Suran, a resident of the Village Tottalam in Kil-Adaiyaru-nadu, a sub-division of Paduvur-kottam.

25. PANDYA INSCRIPTION, ARJUNAPURAM, DISTRICT VIRUDHUNAGAR

This inscription, in Tamil language and characters of the thirteenth century AD is engraved on a pillar near a well of Alagasundara Perumal Temple. Dated in the 21st year of the reign of the Pandya king Kulasekhara, it states that a well called Asiriyarkandan was purchased by an individual Nangan Chokkan, probably for gifting the same to the temple (pL. 150).

26. PANDYA INSCRIPTION, AYYANKOLLAMKONDAN, DISTRICT VIRUDHUNAGAR

This inscription, in Tamil language and characters, is engraved on a sluice stone of Periyakulam Tank. It belongs to the reign of Pandya king Sri-Venru malaiyitta perumal Vira-Pandyadeva and issued in the 23 + 13th year of the king. Dated Saka 1375 (AD 1453), it records the construction of a barrage *{madai)* called *Virapandyan-madai* located at Kollangondan in Anmanadu, in order to irrigate the reclaimed lands in and around the area by an individual Karuvur Periyan, probably a local chieftain.

27. PANDYA INSCRIPTION, KULASEKHARANALLUR, DISTRICT VIRUDHUNAGAR

This Tamil inscription on a pillar erected before Muniyandisvami Temple belongs to the 23rd year (AD 1303) of the Pandya king Sri-Kulasekharadeva. It records the gift of a pillar by one Manian kuttar Pon, a resident of Manakkavur.

28. PANDYA INSCRIPTION, VIRUDHUNAGAR, DISTRICT VIRUDHUNAGAR

This record, engraved on a stone slab kept in the P.W.D. office, is in Tamil language and *Vattelutu* characters of the ninth century AD. Dated in the 8th regnal year of the Pandya king Sadaiyan Maran, it states that an individual, Kilavan, Etti Sattan of Iruppaikkudi had built a hall *(ambalam)* at Nenmali in Irunjola-nadu. The same person is also stated to have repaired the old bund of the bank which he named Kilavaneri after his name and also set up a stone sluice to the above tank.

UTTAR PRADESH

29. PEDESTAL INSCRIPTION, FATEHPUR SIKRI, DISTRICT AGRA

Engraved on the pedestal of a standing image of Sarasvati from the excavated site known as Birchhabili-ka-tila, this inscription is in Sanskrit language and Nagari characters. It is dated in Vikrama 1067 (AD 1010) and records the installation of (the image) of Sarasvati by two committees probably known as Sanchamara and Bhallika in the Santivimalacharya-vasati (Jaina temple) during the reign of Sri Vajrama of Sikri (pi. 151).

30. COPPER-PLATE INSCRIPTION, JHANSI, DISTRICT JHANSI

Engraved on a copper-plate and dated Vikrama 1747 (AD 1690), this inscription in local dialect and Nagari characters, records the perpetual grant of twenty *bighas* of land in Bambhotara, probably, to *Purohita* Prema by the order of *Maharajadhiraja Maharaja Ravataji* (Sri Pratapasimhaji). It refers to *Gaya-sraddha* and mentions *Saha* Varadhamanaji. The grant was written by Soni Hira.

Plate 150

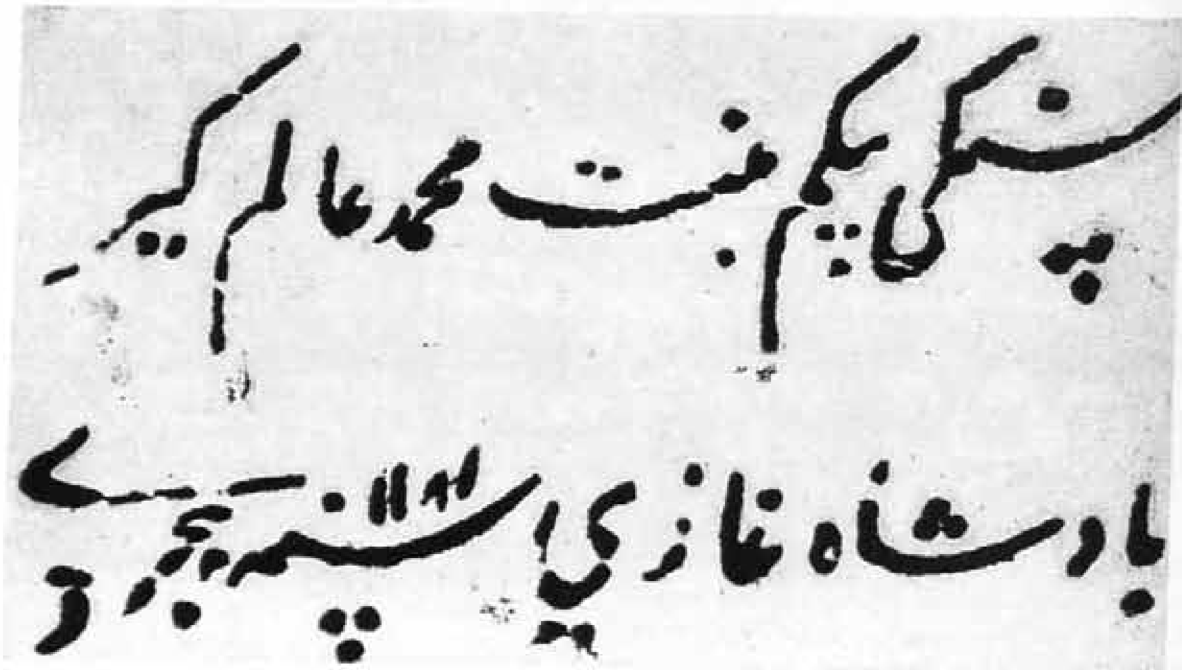


Arjunapuram: Pandya inscription

Plates 151-152



151



151

*Birchhabili Tila:*151, *pedestal inscription;*
152, *Delhi: Persian epigraph on the grave of Sangi Begam*

ARABIC AND PERSIAN INSCRIPTIONS[1]

DELHI

1. MISCELLANEOUS INSCRIPTIONS, DISTRICT DELHI

Among the miscellaneous inscriptions photographed or copied from different parts of Delhi, four records are worth mentioning. The first one, which is a later installation in Persian, comes from the Dargah-complex of Hadrat Khwaja Nizamud-Din-Auliya. It records the date of death of Hadrat Khwaja 'Abdur Rahim *alias* 'Abdur' Rahman, the superintendent of the *Langar Khana* (kitchen for the poor) and chief servant and spiritual disciple of Hadrat Nizamud-Din-Auliya Mahbub-i-Ilahi, in AH 730 (AD 1330). It also records that (the grave was) renovated by Haji Mubarak Nizami.

The second inscription in Persian, which is again a later installation, comes from the same Dargah-complex, obviously pointing to the grave of a famous Tughluq historian who authored *Tarikh-i-Firuz Shahi.* The brief inscription simply reads: *Hadrat Khwaja Shamsud Din Musannif-i-Tarikh-i-Firuz Shahi.* Here it may be added that the said historian was more popular with the name *Shams Siraj Afif.*

The third record in Arabic, executed in Naskh characters, is dated AH 974 (AD 1566-67) and bears only Quranic text (Chapter II, verse 255) without recording the name of the occupant of the grave. It comes from Afsarwala Tomb in the vicinity of Humayun's Tomb-complex.

The fourth one is a metrical Persian epigraph photographed from a ruined Haveli (belonging to Rai Bahadur Pandit Janki Nath), recording the construction of obviously the Haveli on which it appears (of which only the gate remains with the inscription) is Sambat 1931, corresponding to Fasli 1283, AH 1291 and AD 1874. All the four corresponding dates are given in both numerals and chronograms.

2. MUGHAL. INSCRIPTIONS, DISTRICT DELHI

Of the two Mughal records, one belongs to the grave-complex of Mutamid Khan, a noble under Aurangzeb, in the Dargah of Hadrat Qutbud-Din-Bakhtiyar Kaki in Delhi. It is a metrical record in Persian in Nastaliq characters, saying that it was during the reign of the manifestation of God the king Alamgir Muhyiud-Din (i.e., Aurangzeb), that Mutamid Khan chose (for his burial place) the dust of the feet of Shah Qutbud-Din with the hope of acquiring God's pardon. The date for the erection of the tomb is given in a chronogram, yielding the year AH 1084 (AD 1673-74).

The other one is a later Mughal brief Persian epigraph copied from Humayun's Tomb-complex (pi. 152), obviously recording the death of Sangi Begam daughter of Muhammad Alamgir (II) Badshah Ghazi, in AH 1181 (AD 3767).

MAHARASHTRA

3. MISCELLANEOUS INSCRIPTION, DISTRICT AURANGABAD

An epigraph from Daulatabad Fort is damaged and weather-beaten. It appears to be a pre-Mughal Persian record in Naskh characters.

[1]Information from : M. Ilyas Quddusi, Director (Epigraphy), Arabic and Persian Inscriptions, Nagpur, assisted by M. Yaseen Quddusi, G.S. Khwaja, and M.A. Zeya, who copied, examined and reported on one hundred and fifty-one inscriptions during the year under review, out of which only the important ones are noticed here.

The decipherable part of the text indicates towards laying out of a garden and construction of a cistern, etc.

4. MISCELLANEOUS INSCRIPTIONS, DISTRICT NAGPUR

Among the old family possession of the ex-Gond rulers of Deogarh who shifted their capital from Deogarh (in Chhindwara district of Madhya Pradesh) to Nagpur, there are some old badges of the officials of the royal family, bearing bilingual, i.e., Persian and Hindi inscriptions. The earliest one of these badges is dated AD 1819, reading *Chaprashi-i-Ilaqa-i-Suprid Sarkar Deogarh,* i.e., the bearer of a *Chapras,* i.e., a badge plate or office-messenger of the region Suprid in the *sarkar* of Deogarh. Two other badges bearing the date AH 1270 and 1264 Fasli (AD 1853) read : *Chaprasi Sarkar Sastanik (Suwasthanik) Ilaqa-i-Qala Nagpur,* i.e., the office-messenger of the wards of the *Qala* (fort) region of Nagpur. Of the same content is the fourth badge but dated AH 1271, Fasli 1264 (AD 1854-55).

TAMIL NADU

5. MISCELLANEOUS INSCRIPTIONS, DISTRICT CHENNAI

Two inscriptions have been photographed from two different mosques named Masjid-i-Saidiyya and Masjid-i-Jami, Azam in Chennai. The metrical Persian record in Nastaliq characters from Masjid-i-Saidiyya records its construction by Haji Muhammad Padshah entitled Said Alam in AH 1270 (AD 1853-54).

The other Urdu record from Masjid-i-Jami Azam registers the name of the original builder (of the mosque) Alhaj Hadrat Hafiz Ahmad Khan along with the date AH 1232 corresponding to AD 1812 (irregular) followed by its extension five times at later stages.

Here it may be added that the original stone, bearing metrial Persian inscription of this mosque, was copied earlier and listed in the *Annual Report on Indian Epigraphy (1961-62,* Appendix No. D-109) whereby Azam Jang is known to have built the mosque in AH 1232 (AD 1816-17) and the composer of the text Faiq worked out the chronogram *Masjid-i-Jami Azam,* yielding the said date. Thus the earlier record and the present one supplement each other in giving information about the builder of the mosque whose full name along with the titles was Alhaj Hadrat Hafiz Ahmad Khan Azam Jang.

UTTAR PRADESH

6. SIR INSCRIPTION, DISTRICT BAND A

This historically important Persian record was copied from the Jami Masjid in Kalinjar Fort. Its prose portion records the construction of the Jami Masjid (without mentioning any specific date) in the Shergarh Fort *alias* Kalinjar after the grand and magnificent reign of Sher Shah at the royal order of Islam Shah. The text in prose is followed by a *mathnawi,* comprising twenty-four couplets, referring to the conquest of Kalinjar Fort, death of Sher Shah and speaking high of Islam Shah and the veteran minister Khan-i-Azam, etc.

7 MUGHAL. INSCRIPTIONS, KORA JAHANABAD), DISTRICT FATEHPUR

Of the two Mughal inscriptions, the first one in Arabic and Persian, broken into six pieces, was

Plate 153



Kora Jahanabad: inscription of Shah Jahan

copied from Kora-Jahanabad from the Madrasa Masjid. It assigns the construction of the mosque in Madrasa Lutfullah, to Nur Muhammad during the reign of Shah Jahan Sahib-i-Qiran-i-Thani (AD 1628-58) (pi. 153).

The other Persian inscription comes from Fatehpur, recording the construction of a grand mosque by 'Abdul Ghani' at Fatehpur in AH 1075 (AD 1664-65). The metrical text was composed by Muttaqi.

8. MISCELLANEOUS INSCRIPTIONS, DISTRICT FATEHPUR

A brief Persian record pertaining to a mosque comes from Fatehpur which obviously assigns the construction of the mosque to Banda Yar Khan in AH 1140? (AD 1727-28).

A damaged inscription in Arabic and Persian was copied from Kora Jahanabad that records the construction of a mosque by (name of the builder lost) in AH 1143 (AD 1730-31). While a badly damaged Persian inscription was photographed from a well in the village Garhi Jar. The extent portion of the text obviously refers to the date AH 1144? (AD 1731-32) when the well was constructed by Sayyid (remaining portion of the name lost).

Another brief Arabic record of religious nature was copied from a mosque in Kora Jahanabad. This record without mentioning the name of the builder refers to the date AH 1195 (AD 1780-81) obviously the year when the said mosque was erected.

Basically a versified Persian inscription in a damaged condition from Airawan was photographed that assigns the construction of a mosque to Farzand ? 'Ali, an attendant of the holy shrine of Hadrat Ali at Najaf (in 'Iraq).

Miyan Haidar Bakhsh was the builder of a mosque in AH 1228 (AD 1813), according to a metrical Persian epigraph photographed from Kora Jahanabad. From the same place comes a bilingual i.e., Sanskrit and Persian inscription from a temple, recording that the Vaishya Bhagwan Das, son of Parmanand, got a temple of god Sambhu (Siva) constructed in Samvat 1906 corresponding to AH 1265 (AD 1849).

A metrical Persian record from Fatehpur is an important one as it highlights the spirit of religious tolerance and social harmony. This precious record dated AH 1278 (AD 1861-62) assigns the construction of Kaba-like mosque to Har Sahai, a celebrated man of rank. The metrical text was composed by Gulshan. While another metrical record in Persian from the same place registers the foundation of a mosque *(baitul haram)* by Tawaif *alias* Sital of Fatehpur in AH 1291 (AD 1874-75).

9. MUGHAL INSCRIPTIONS, DISTRICT KAUSHAMBI

A couple of Mughal dynastic records come from Purkhas, belonging to two different mosques. The first one is bilingual Arabic and Persian inscription in a crude hand, of which the historical portion in Persian, records that one Shaikh Mansur son of Shaikh Farid had built a mosque. Later on it was dilapidated and after the death of .... Hamid and Pir Muhammad? Repaired the house of (God), i.e., the said mosque in the *suba* of Allahabad in the ruling tract of Nawwab Saif Khan in AH 1079 (AD 1668-69) (during the reign of) Badshah Ghazi Aurangzeb.

The second inscription which is trilingual, i.e., in Arabic, Persian and Hindi, assigns the

construction of a mosque of Shaikh Rajab Ali, son of Shaikh Muhammad Bikan, zamindar of Taluqa Purkhas Thok Pachhim in AH 1248 (AD 1832-33) corresponding to fasili 1238 (irregular) at the hands of Shaikh Dust Muhammad and Shaikh Munawwar, during the rule of Akbar Shah Badshah Ghazi.

10. MISCELLANEOUS EPIGRAPHS, DISTRICT KAUSHAMBI

A good number of inscriptions have been copied/photographed from different places of the district. Of these, the earliest one is from Mahgaon which is a beautiful execution in Nastaliq characters but partially damaged and weather-beaten. It is a metrical Persian record, assigning the construction of a mosque, an inn and a well, to one Muhammad Shafi in AH 1237 (AD 1821-22) according to the chronogram. Here it may be added that the date given in numerals in 1227 which is an inscribing error for 1237.

Again another metrical inscription in Persian and Urdu was copied from Mahgaon, registering the construction of a mosque at Mahgaon in AH 1250 (AD 1834-35) by a lady named Chanchal, wife of Daim Ali. Sayyid Azam was the composer of the metrical text.

Among the miscellaneous inscriptions copied from Manjhanpur, mention may be made of the metrical Persian record from a local mosque that assigns the construction of an unexampled mosque of Sayyid Ali Haidar in AH 1268 (AD 1851-52). In the same inscription, it is also recorded that the builder of the lofty mosque was the dignified Mir 'Ali Abbas' in AH 1272 (AD 1855-56), Sayyid Warith Ali was the composer of the text and Sayyid Asghar Ali, the inscriber. It appears that the work started on the first date and completed on the second. Next Persian inscription pertains to the Karbala, recording Zahirud-Din-Hadi (son of) 'Abdullah as the builder obviously of the Karbala, in AH 1270 (AD 1853-54).

A beautiful Persian inscription in metrical form in excellent Nastaliq characters, from an Imambada in Manjhanpur assigns the construction of the Imambada to the generous chief Sayyid 'Ali Abbas in AH 1281 (AD 1864-65). The metrical text in two parts was composed by Warith and Zaki and calligraphed by Sayyid Asghar Ali, a resident of Qasba Kara (in Allahabad district of Uttar Pradesh). Another metrical Persian record dated AH 1300 (AD 1882-83), from Manjhanpur records the construction of an elegant and well-shaped mosque by Jhau Miyan.

A couple of miscellaneous epigraphs from Jafarpur Mahawan are worth mentioning. Of these, the first one is an epitaph, recording the death of Afdal Husain in the prime of his life in AH 1306 (AD 1888-89). The metrical text of this epigraph was composed by Hamid. The second epigraph in metrical Urdu, composed by Tawwakal, assigns the construction of a new entrance gate in the existing old mosque, to the generous grand chief Fath Muhammad, in AH 1314 (AD 1896-97).

An incomplete epitaphic Persian record from the compound of a Karbala in Manjhanpur recounts the death of Sayyid Tafaddul Husain, the native of Qasba Jarcha, District Bulandshahr, who had come to Manjanpur to visit his nephew Sayyid Husain, the Tahsildar of Manjanpur (unexpectedly) passed away in AH 1315 (AD 1897). The text was composed by Yazdani, the elder brother (of Sayyid Husain).

III. NUMISMATICS AND TREASURE TROVE

GUJARAT

1. SILVER AND COPPER COINS, DELOL, DISTRICT GODHRA

Four silver and seventeen copper coins were recovered from the dry bed of Goma river, locally known as Bhuliya Dhara of which two silver coins belong to the Western Kshatrapas and the other two are corroded. The copper coins belong to the early medieval and medieval periods (pl. 154).

HARYANA

2. COINS, AMBALA, DISTRICT AMBALA

Eighty coins belonging to different periods were acquired as donations from Raj Kumar of Ambala to the Panipat Museum, under the Department of Archaeology and Museums, Haryana.

3. COPPER COINS, ATELA, DISTRICT KAITHAL

Four hundred fifty-three copper coins of the period ranging from twelfth century to fourteenth century AD were collected from village Atela by a team led by D.S. Malik, of the Department of Archaeology and Museums, Haryana.

4. COINS, SHAHPUR, DISTRICT PANIPAT

Thirteen coins of Lodi period were recovered from village Shahpur by D.S. Malik, of the Department of Archaeology and Museums, Haryana.

5. MISCELLANEOUS OBJECTS, PANIPAT, DISTRICT PANIPAT

The Department of Archaeology and Museums, Haryana, enriched its collection by acquiring one hundred and twenty-nine silver coins, silver ornaments; pendant, three rings and twelve buttons of gold as treasure trove.

6. COPPER COINS, MAJRA, DISTRICT ROHTAK

Three copper coins of the eleventh century AD were collected from village Majra by D.S. Malik, of the Department of Archaeology and Museums, Haryana.

KERALA

7. COINS OF SULTANS OF MYSORE, BEKAL FORT, DISTRICT KASARGOD

A hoard of coins was found at the surface level in Bekal Fort by the Thrissur Circle, of the Survey. These coins were examined by the Epigraphy Branch (Arabic and Persian Inscriptions), of the Survey, Nagpur. The hoard

Plate 154



Delol: copper and silver coins and miscellaneous objects

comprises a copper coin, i.e., a paisa belonging to Tipu Sultan, dated 1212 (AD 1797) and minted at Patan, i.e., Srirangapatna.

N. SILVER COIN, BEKAL FORT, DISTRICT KASARGOD

This coin belonging to the French Company, was minted at Phulchery, dated AD 1718. It also contains "P" as a mint mark.

UTTAR PRADESH

9. COPPER COINS OF THE MUGHALS, MAHETH, DISTRICT BAHRAICH

The Director (Epigraphy), Nagpur, of the Survey received nine copper coins from the Excavation Branch III, Patna, of the Survey, for identification and study. All the coins represent Akbar (AD 1556-1605) and minted at Dugam, i.e., Dugaon in Bahraich district. These coins are dated between AH 988 (AD 1580) and AH 1001 (AD 1592-93).

WEST BENGAL

10. SILVER COINS OF SULTANS OF BENGAL

Photographs of two coins of the Sultans of Bengal were forwarded to the Epigraphy Branch, Nagpur by the Calcutta Circle, of the Survey. Of these one coin belongs to Shihabuddin Bayazid Shah (AD 1409-14). Its date and mint name are abraded. The second coin represents Jalaluddin Muhammad Shah (AD 1414-31). Its date and mint name are lost. It is similar to Chatgaon issues of the king.

IV. OTHER IMPORTANT DISCOVERIES

ASSAM

1. ANCIENT REMAINS, BARABHITA, DISTRICT GOALPARA

The Guwahati Circle, of the Survey, explored the village Barabhita and reported the discovery of an ancient kiln and remains of highly stylistic burnt terracotta girder-like pieces (part of votive stupas) with figures of Buddha in *bhumisparsa-mudra* in a row. Impressed on soft clay, such stylistic burnt terracotta pieces are reported for the first time in Lower Brahmaputra Valley.

2. ROCK-CUT CAVES, SIVA-LINGAS AND SCULPTURES, DEK-DUA, DISTRICT GOALPARA

A team from the Guwahati Circle, of the Survey, noticed a large number of rock-cut Siva-*lingas,* sculptures of Ganesa, Vishnu and rock-cut caves as well as neatly cut staircase on hard rocks found near the sculptures in village Dek-dua on the bank of Brahmaputra river. A few potential brick structure was also noticed along with decorated bricks, etc.

GOA

3. ANCIENT REMAINS AT GAUDIMOULA, DISTRICT NORTH GOA

A Heritage walk was undertaken from Old Goa to St. Anne Church, Talaulim through Kadamba Plateau by different institutions like the Mini Circle of the Survey, Goa; National Institute of Oceanography, Department of History, Goa University and some local colleges to identify the Kadamba Road and other associated structures belonging to Kadamba (tenth-thirteenth century AD), Vijayanagara (fifteenth century AD) and Portuguese times. During the Heritage walk, the team discovered the ruins of a monastery belonging to Portuguese period where laterite structures with underground cellars were found. At a place called Gaudimoula a sun-dial made of basalt in hourglass shape was found a section engraved with numerical digits from 1 to 12 and also sub-digits indicating fraction of timings. Based on comparative studies this sun-dial is datable to the Portuguese period. This was acquired and handed over to the Archaeological Museum, Old Goa, for display.

4. PREHISTORIC ROCK-ENGRAVINGS, MAUXI, DISTRICT NORTH GOA

J.V.P. Rao, assisted by Manoj Saxena, Siriguru Bagi, Gangadhar Korgaonkar, Gopal Rao, Prakash Gaonkar, of the Mini Circle, Goa, of the Survey, discovered a new site with prehistoric rock-engravings at Mauxi in Satteri taluk of North Goa, adding to the list of known sites of prehistoric rock-engravings at Usgalimol and Cazur of Goa. The engravings are found on the basalt bed-rock of a local stream which get inundated during rainy season. The depiction of rock-engravings include a humped bull, deer, antelope, *trisula* and a foot mark.

The bull (pi. 155) at Mauxi (Goa) recalls the rock bruisings found at Maski, in District Raichur of Karnataka. On comprative study, the bull at

Plates 155-156



155



156

155, *Mauxi: rock-engraving showing bull;* 156, *Patiya: standing image of Vishnu*

Mauxi is found to be crude in depiction while at Maski, the form is more stylized. The Maski bull was dated to Chalcolithic times (first millennium BC). The deer at Mauxi is depicted with linear depiction, elongated body, legs shown separately in lines with a raised head and short-raised tail. The parallels can be drawn from a known site at Piklihal in Karnataka where such engravings were found extensively. At Piklihal these engravings were dated to Chalcolithic times.

5. ANCIENT MOUND, JALAT, DISTRICT DAHOD

D.R. Gehlot along with N.K. Pathak of Vadodara Circle, of the Survey, discovered an early historical mound (300 X 150 X 10m) on the eastern bank of River Khan. There were remains of brick (42 X 26 X 8 cm) structures apart from early historical carinated *handi* in black ware, deep bowl and lid in red ware; stone sculptures of Uma-Mahesvara, Narasimha, *linga, nandi* and architectural members, datable between eighth and tenth centuries AD. On earlier survey *(1968-69,* p. 7) Late Stone Age sties were reported from its vicinity.

6. SCULPTURES AND ARCHITECTURAL MEMBERS, DELOL, DISTRICT GODHRA

D.R. Gehlot, assisted by N.K. Pathak, of the Vadodara Circle, of the Survey, discovered the shaft of *Siva-linga* along with some architectural members including a *chandrasila* on the dry bed of Goma river, locally known as Bhutya Dhara. Besides, thirteen other sculptures and architectural members recovered from the site are now preserved near the Maha Kali Temple. All these remains are datable to early medieval period.

7. VISHNU SCULPTURE, PATIYA, DISTRICT VADODARA

N.K. Pathak of the Vadodara Circle, of the Survey, discovered a four-armed Vishnu sculpture (32 X 16 X 4.5 cm) made on schist datable to *circa* fourth century (pl. 156).

HARYANA

8. SCULPTURES, NAGURA, DISTRICT JIND

Six sculptures from village Nagura, and one sculpture from Panipat, collected by D.S. Malik and S.K. Arora, of the Department of Archaeology and Museums, Haryana, are now housed in the Panipat Museum.

9. SCULPTURES, MAIRA, DISTRICT ROHTAK

The Department of Archaeology and Museums, Haryana, reported the discovery of eight sculptures from the village Majra by D.S. Malik along with M. Acharya and Ranvir Singh. These icons depict the various froms of Ambika, door-attendants, attendant-couple, Lakshmi, three elephant heads, broken dancing Ganesa of Gurjara-Pratihara period.

HIMACHAL PRADESH

10. LOOSE SCULPTURES AND ARCHITECTURAL FRAGMENTS, SIVA TEMPLE, BAIJNATH, DISTRICT KANGRA

Piyush Bhatt, of the Chandigarh Circle, of the Survey, documented ninety-four loose sculptures and architectural fragments datable from eleventh-twelfth to the sixteenth-seventeenth century.

JAMMU AND KASHMIR

11. KUSHAN COPPER COINS, AMBARAN, DISTRICT JAMMU

B.R. Mani, of the Srinagar Circle, of the Survey, collected copper coins of Kanishka and Huvishka at the hamlet Pambarwan at Ambaran near Akhnur besides fragments of fingers of post-Kushan terracotta human figurines.

12. INSCRIBED BOM SI AMP, SEMTHAN, DISTRICT PULWAMA

B.R. Mani, of the Srinagar Circle, of the Survey, found a 4.4 cm long bone stamp in the form of a stylus. Its flat end contains letters *gaja* in Brahmi script of post-Kushan period (c. fourth century AD) while the other end of it is pointed. The stamp might have been used to produce metallic seals with negative inscribed legend for sealing on which the letters appear in positive.

MEGHALAYA

13. NEOLITHIC SITE, BARAPANI, DISTRICT EAST KHASI HILLS

The Department of Art and Culture, Government of Meghalaya, reported the discovery of a neolithic site, situated at about 15 km north of Shillong (91° 52" E ; 25° 37" N). The site is now badly disturbed due to the construction of the Barapani Dam, construction of houses and road besides agricultural activities carried out by the local residents of Mawiongrim village. During the preliminary exploration of the site, some crude prehistoric stone artefacts were collected.

14. NEOLITHIC SITE, UPPER SHILLONG, DISTRICT EAST KHASI HILLS

The Department of Art and Culture, Government of Meghalaya, reported the discovery of forty prehistoric stone tools of different types and shapes from a site situated (91° 52" E; 25° 57" N) at a distance of about 7 km, south of Shillong. The site is still intact with a cluster of monoliths of different sizes and shapes covering the area of about 60 x 30 m.

15. NEOLITHIC SITE, ASANANGRE-RONGRAM, DISTRICT WEST GARO HILLS

The Department of Art and Culture, Government of Meghalaya, reported the area (90° 15" E; 25° 33" N), located at a distance of about 10 km, north of Tura, the district headquarter of West Garo Hills consists of Selbagre, Misimagre, Rongre, The brongre. Ganolgre areas etc. The exploration of the site yielded forty-five prehistoric stone artefacts consisting of flake stone axes, scrapers, points, borers, blades, choppers, etc.

16 PREHISTORIC SITES, RONGRAM, DISTRICT WEST GARO HILLS

Exploration of Didamy Valley in Rongram areas of West Garo Hills of Meghalaya by the Guwahati Circle, of the Survey, brought to notice five prehistoric sites exposed along the river sections. The tools comprise handaxes scrapers, points and large number of flake tools of Stone Age.

TAMIL NADU

17. TOMB STONES, DUTCH FORT, SADRAS, DISTRICT KANCHIPURAM

During earth work excavation by the Chennai Circle, of the Survey, around the magazine and secret tunnel to expose the plinth, five tomb-stones and an ancient drain-like structure leading from top of magazine to outer fortification wall on south-west corner of Fort and one more drain-like structure was found all along the wall of the cemetery.

I8. DURGA SCULPTURE, BRAHMADESAM, DISTRICT VILLUPURAM

G. Thirumoorthy, of the Chennai Circle, of the Survey, reported the discovery of a relief sculpture of Durga carved on a rectangular stone-slab (170 X 90 X 15 cm). It was discovered on the back side of Brahmapurisvara Temple-complex, Brahmadesam. The deity is in *samabhanga* with eight arms holding *sankha, chakra, trisula,* bow and arrow besides a parrot, tied with a rope. On the basis of stylistic features, the sculpture could be datable to *c.* sixth century.

19. ANCIENT FOUNTAIN, KALYANA MAHAL, FORT GINGEE, DISTRICT VILLUPURAM

Kalyana Mahal has a stepped-tank with a *nirali- mandapa* at the center. While deplastering the steps for conservation work a chance discovery was made by the Chennai Circle, of the Survey, of an ancient fountain of the Gingee Nayaka period. This ancient fountain was introduced by the builder in the stepped-tank approximately 40 cm below the existing floor level. The ancient fountain was made of terracotta. A terracotta pipe runs alround over the fourth step from the bottom. Its diameter is 10.25 cm and thickness 1.2 cm. The terracotta pipes have a wide mouth on one side, without any edge. The diameter is reduced to 1.5 cm at the bottom. Each pipe was interlinked with one another. This terracotta main pipe is covered exteriorly alround with country tiles. These were cemented with lime. The pipe has got opening on the top portion at a regular interval with a distance of 38.25 cm. From these a conical terracotta outlet was affixed. Its height is 64.5 cm. This pipe is not a single one. It has a number of such conical terracotta pipe; each one having a length of 6.5 cm and diameter of 5 cm at the bottom and 3.5 cm at the top. Such terracotta pipes are fitted one over the other vertically to get the required height. At the top a 6 cm long copper pipe is found inserted. Inside the copper pipe, a small terracotta opening was fixed. Over the pipe a thick terracotta disc with a small nozzle is provided. This arrangement is made to obtain water pressure for the fountain to function and to safeguard the terracotta from external damage. Another important discovery in the same monument was made during conservation work, when an opening was traced on the side of the entrance below the existing flooring at the entry on south-west corner. When the floor was dug at the entrance, the original floor level with lime-plaster and sidewalls with flight of steps (3) leading to the stepped-tank was unearthed.

UTTAR PRADESH

20. Stone Jar, Fatehpur Sikri, District Agra

The Agra Circle, of the Survey, under D. V. Sharma, identified a massive stone jar, originally built in four parts which was found in the south-east corner of the platform near the Khwagbah Palace. Its base, being the lowermost part, is firmly embedded in the floor, while slightly curved (convex), wedge-shaped slabs of the upper parts, were lying around. Curiously, the plan and elevation of this massive jar are inscribed (so to say, incised) in scale on the floor nearby, which helped in its reconstruction. The stone jar is 11 m (3.36) high, 8 m (2.50 m) wide (at the middle portion) and has a 3 ^{l}*A* m wide base. The plan indicates a 2 !4 m wide opening at the rim (mouth) of the jar. The bowl-shaped lower portion is a single piece of red sandstone (monolithic), with a hole in the center, measuring 6 cm in diameter. This central hole is connected to a drainage channel which ultimately discharged unused water and silt into a water-tank situated on its eastern side. This channel was cut into the floor with a fine slope towards the water tank for smooth and proper drainage. The channel measures 1.67 m in length, 6 cm in width and average 6.5 cm in depth. A small water tank is also there on the southern side of the stone jar. This arrangement was made purposefully to keep the entire stone platform cool during the summer season. The platform is also provided with stone hooks with a hole in the center provide an awning *(chandova)* over the jar for protection from the sun, rain and other natural elements.

The jar originally had four parts, each part was provided with interlocking grooves (called 'Mahadeva-Parvati' or male-female, in artisan's terminology), fitting the stone pieces firmly and accurately together. To further strengthen the joints of each stone piece, iron clamps were also used at regular intervals. The exterior and interior surface of the pot was originally plastered with white *chunam* (lime) to prevent water leakage from the pot. Traces of original plaster, with ochre coloured painted bands, are still preserved on the base portion of the pot. The belly portion of the pot is decorated with a rope design in relief all around its second part. The stone pieces used for construction of the second portion of the pot are 1.21 m in height. The third portion of the pot has pieces 4 m in height each and one piece has three holes arranged vertically, one above the other, for extracting water (stored therein) from different levels. The distance between each hole is 0.45 cm (centre to centre). These holes were, perhaps, outlets, provided with a tap of metal, terracotta or wood, purposely made on the higher level of the jar to allow the extraction of pure water, free from sediment.

Twenty-two original pieces were found lying in the vicinity of the pot on the surface. These pieces were collected and joined together on a trial basis, before joining them permanently. After careful observation, each stone piece was placed on a trial basis above the circular bowl, according to the plan and elevation available *in situ* on the floor. The trial exercise was successful and the present shape of the assembled pot tallied correctly with the inscribed elevation. Although embedded traces of iron clamps still exist *in situ* in the bowl-shaped portion of the stone jar, copper clamps of similar size and shape were prepared to fit into the grooves for restoration.

The bowl-shaped, monolithic, lowermost part of the pot, has a hole in the centre duly connected to a channel 2'/$_2$ feet wide. This has

remained *in situ,* unidentified since it was last used. Edward W. Smith identified this bowl as a boiler in one of his drawings prepared in 1891. It was described as a sun-dial, astrolabe, or trough for preparing perfume.

It was Peter Mundy, the English Traveller, who visited Fatehpur Sikri in 1633, first noticed and described in his work *Travels of Peter Mundy* Vol. II, (ed.) R.C. Temple, the Hakluyt Society, (London 1914), pp. 230-1. This also gives the probable function of jar, used for storing water from the Ganga for king's personal use.

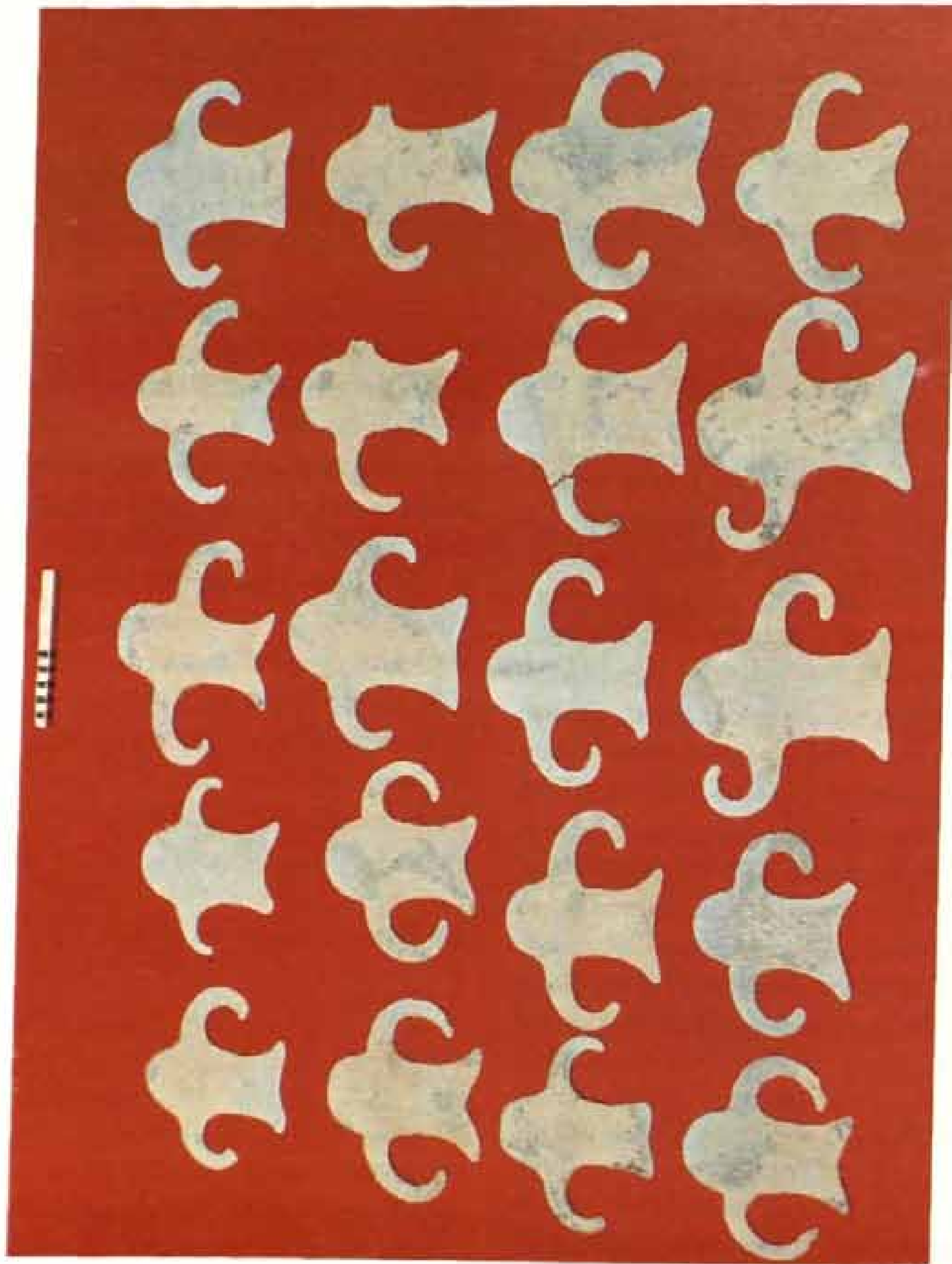
21. COPPER ANTHROPOMORPHIC: FIGURES, MADARPUR, DISTRICT MORADABAD

D.V. Sharma, of the Agra Circle, of the Survey, assisted by V.N. Prabhakar, reported the discovery of thirty-one copper anthropomorphic figures from the right side of Thakurdvara-Surjannagar Road at a distance of 8 km from Thakurdvara tehsil. The height of this field is relatively higher in comparison to adjoining land. This hoard was found *in situ* by a labourer Shamsuddin, a resident of Sharif Nagar and placed one above the other, in a single pot, who concealed the discovery and distributed them between two groups. Subsequently on information, local police recovered thirty-one copper objects from the labourers and later preserved the hoard in police station at Thakurdvara.

The team from the Agra Circle, of the Survey, examined and[1] documented these objects immediately in the Police Station. In total, thirty-one anthropomorphic figures were examined out of which six have broken hand. The size of these figures varies from figure-to-figure. The peculiar feature of these figures is that out of thirty-one figures two were found with their right hand raised above (pi. 157). Moreover, the leg portion of these figures is stylistically indicated only with two projections, which are shown at the base with a concave formation in-between. This could perhaps be the representation of seated cross-legged human being. All the thrity-one anthropomorphic figures are shown in similar 'seated' posture which is itself a unique feature, not noticed earlier.

The find spot of these figures is to the north of a brick kiln and located on the right bank of a seasonal river locally known as Japti *nala,* a tributary of River Ramganga. The Japti *nala* joins Repti *nala* downstream at a distance of nearly 8 km from the site. The Repti *nala* finally joins River Ramganga near Karanpur. The depth of find place is approximately 50 m from the surface. The deposit from which the figures were found, is not only compact in nature but is also very hard to dig. The colour of the deposit varies from yellowish brown to very light brown. Although the local authorities stopped digging at the site, a considerable area was already dug out adjoining the find spot before the discovery of these objects. The exposed section of agricultural field revealed a regular and thin layer of Ochre Coloured Pottery (OCP) deposit. The OCP could be collected from an area of nearly 200 m x 200 m. A small trial-pit was also dug adjoining the find spot in an area of 2 m X 2 m. The trial-dig also revealed the presence of OCP in a thin layer nearly 5 cm in thickness. Moreover, considerable amount of OCP could also be collected from all the exposed area of the agricultural field. The OCP is well comparable to other sites in terms of colour, fabric, friable nature and peeling of colour from

Plate 157



Madarpur: copper anthropomorphic figures

the surface. The discovery of OCP from this site assumes much significance, for the site yielding both copper hoard and OCP are very rare, as its stratigraphical association was known so far from only one site, i.e., Saipai in Etawah district of Uttar Pradesh. This site, if put into archaeological excavation, might yield copper implements along with OCP in a stratigraphical context. However, the discovery of anthropomorphic figures and later, the OCP in a 5 cm thick deposit adjoining the find spot indicates the association of these cultural elements. Further systematic excavation at this site may yield more implements of copper and OCP in the same level, if any such remains are buried underneath.

The OCP sherds collected from the site is extremely limited and fragmentary in nature. The shapes represent vase, bowl and portion of dish-on-stand, etc. The pottery has tendency to peel of easily and one sherd contains matted design. The sherds of OCP from Madarpur resemble some of the late Harappan pottery shapes also. A few shapes are comparable to the pottery found from Bara, Bahadarabad, Saipai, etc. The rim portion among the OCP collection from Madarpur is very limited.

WEST BENGAL

22. ANCIENT REMAINS, TEMPLE AND SCULPTURES, DISTRICT MEDINIPUR

S.B. Ota, assisted by T.J. Baidya, and S Maiti, of the Kolkata Circle, of the Survey, conducted exploration in Natsal under Mahishadal Police Station, located on the right bank of Rupnarayan near the confluence of Rupnarayan and Hugli. The site, approximately measures 150 m X 150 m in area on the river bank. The cultural material recovered here comprise potsherds, beads, terracotta figurines, conch bangles, etc., of early historical period. Of the noteworthy finds there are a large number of bones of both domesticated and wild animals, besides bone tools, mostly points, arrow-heads, scrapers, borers, etc. of the Chalcolithic period and are now preserved in the Tamluk Museum.

S.B. Ota along with S. Maiti, explored another site Laboni under Binpur Police Station. In a gentle slope of the hillock, covered with dense forest, a Bhumij burial ground of three hundred years old was noticed. These tumuli indicate the age-old practice of megalithic burials prevalent in different parts of India.

One more site Rajpara village under Binpur Police Station was surveyed where a brick-built *sikhara* of a temple of nineteenth century was traced. One burial ground with i/ew/-shaped memorial pillars was also reported. Beneath these pillars were noticed earthen pots containing human bones, One Jaina stone idol of Parsvanatha was also found here. The image and burial ground may be datable to *c.* tenth-twelfth century.

T.J. Baidya, assisted by S. Maiti, S.K. Ghosal and T. Datta of the Kolkata Circle, of the Survey, reported the discovery of remnants of the fort-cum-palace of Karnagarh in Salboni Police Station, along with a few temples and ancient tanks, etc. Special mention may be made of the *Atchala* Siva temple, one flat-roofed rectangular *Durga-mandapa* inside the fort-complex. Other temples outside the complex include one *ekaratna* laterite temple resembling the Bishnupur style, flat-roofed Jagannatha Temple, Dandesvara Temple and Mahamaya Temple, etc.

V, PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATION[1]

The report incorporates the results of investigation carried out at the Birbal Sahni Institute of Palaeobotany, Lucknow, on the plant remains collected from the mesolithic settlement at Damdama, District Pratapgarh, Uttar Pradesh, by the Department of Ancient Indian History, Culture and Archaeology, Allahabad University, Allahabad, in 1987.

UTTAR PRADESH

Damdama (26° 10' N; 82° 10' 36" E), District Pratapgarh: A cumbersome amount of carbonized botanical remains was collected from a wide range of strata at varied depths, in about 1.50 m thick mesolithc habitational deposit, divisible into ten layers. In view of the vagaries of incidental preservation by carbonization and the sparseness of deceptive plant remains in highly fragile state, it was felt desirable to subject the larger quantities of soil from the varied strata of deposits for the retrieval of material evidence. Technique of water floatation, utilizing differences in density of organic and inorganic material to achieve separation of carbonized remains from the deposits, enhanced the quantity and quality of botanical material. Majority of plant remains, turn to be a mixture of carbonized seeds and fruits along with a bulk of fragments of charcoal pieces. Repeated wetting of carbonized material, during the floatation, led to considerable deterioration creating obstructions in the identification of a number of seeds and fruits. A rigorous analysis of Damdama plant remains during the last two years has resulted in the generation data on the botanical finds in the mesolithic context at this site.

A portion of morphologically well preserved remains of seeds and fruits of wild grasses, sedges and dicotyledonous plants, avoiding much heat-distorted and mutilated specimens, permitted the safe identification of Foxtail-grass *{Setaria* cf. *glauca),* Crowfoot-grass *{Dactyloctenium aegyptium),* Job's tear *(Coix lachrymajobi),* Goose-grass *(Eleusine indica),* Barru-grass *{Sorghum* cf. *halepense),* Purslane *{Portulaca* cf. *oleracea),* Bristle-grass *{Setaria* cf. *verticillata),* Gular *{Ficus glomerata),* Heliotrope *{Heliotropium* cf. *indicum),* Wild-jujube/Jharberi *{Ziziphus nummularia), Dock/Jangali-palak {Rumex* cf. *dentatus),* Viskhapara *{Trianthema* cf. *portulacastrum),* Bhui-anwala *{Phyllanthus* cf. *asperulatus),* Basil/Tulsi *{Ocimum* cf. *tenuiflorus),* Dayflower *{Commelina* cf. *benghalensis),* wild-rice *{Oryza rufipogon),* Kodon *{Paspalum* cf. *scrobiculatum),* Anjan-grass

[1]Contributed by K.S. Saraswat, Birbal Sahni Institute of Palaeobotany, Lucknow, 226 006

(Cenchrus cf. *ciliaris),* Madlatah *(Bridelia* cf. *stipularis)* and the species of Flatsedge *(Cyperus),* Takri/Crab-grass *{Brachiaria),* Bulrush *(Scirpus),* Bathua/Goosefoot *(Chenopodium),* Kharanti *(Sida)* and Tick-clover *(Desmodium).* The seeds and fruits of foxtail-grass, job's tear, kodon, gular, *bathua,* jharberi and wild rice, and also the leaves and tender shoots of *bathua, jangali-palak* and dayflower are important ones, which might have been gathered by the ancients for food. The carbonized tuber pieces comparable to those of a species of *sedge-Cyperus rotundus,* are suggestive of the probable exploitation of starchy rhizomes also for consumption. These plants of which seeds, fruits and underground parts are consumable, suggest in all likelihood, the food-gathering habit of mesolithic people at the site and probably in the surrounding region. Mixed up in these remains, startling remains of the cultivated forms of Rice *{Oryza saliva)* and Barley *(Hordeum vulgare)* are also encountered. A few small pieces of wood charcoals on being sectioned, are found to be Bamboo *(Bambusa* sp.), Palash *{Butea monosperma).* Jujube *(Ziziphus* sp.) and Heens/Jhiri *(Capparis sepiaria/ horrida).*

VI. MUSEUMS

1. GOVERNMENT MUSEUM, AGARTALA

The museum acquired an icon of Vishnu in bronze datable to ninth-tenth century, from Nalchhar, West Tripura, through the OC, Police Station, West Tripura on donation. The image is in standing position on a pedestal, wearing *kirita-mukuta* and a *vana-mala.* holding *sankha, chakra, gada* and *padma.*

2. ORISSA STATE MUSEUM, BHUBANESWAR

A beautifully carved chlorite image of Balagopala (52 cm in height) was recovered from the Malkhana of Kishore Nagar Police Station, Cuttack by Orissa State Museum, Bhubaneswar. The image is standing in *tribhanga* pose on a lotus pedestal, holding a flute and also wearing ear-rings. It has sharp nose and hair arranged in a top knot. The sculpture is in excellent state of preservation, datable to sixteenth-seventeenth century AD. This was recovered from Kisannagar.

3. ARCHAEOLOGICAL MUSEUM, OLD GOA, GOA

During the period, nine damaged wooden windows of reserve collection, stores and office were replaced with fresh teak wood windows. It also provided 315.66 sq ft of vertical blinds curtain for eight windows in Gallery 6 in order to protect the portrait gallery from the direct sunlight and to give better look to the gallery. Digital documentation of seven hundred and twenty-one antiquities, with the help of ICOM was completed and a compact disc was ready for release. Attended patch painting work by OBD to the entire interior walls of the first floor galleries (6, 7 and 8). The northern wall of lobby is badly damaged by saline and capillary action which was deplastered and then plastered and painted with OBD. The ground floor was painted with double coat by .OBD after scraping and patch plastering. Prepared an Island wooden showcase and displayed various decorated Chinese ceramics and tiles of Portuguese period in Gallery 6. Provided a small booth as Ticket counter and a new collapsible gate to the main entrance to the museum in place of the old one. Old iron railings for old collapsible gates of Cameos rooms, boat room and room with reserve collection (II) were replaced. Post construction anti-termite soil treatment was done to the entire ground floor and first floor of the museum. Bilingual (English and Hindi) labels for all displayed antiquities of the museum along with new acrylic label holders were provided. Wood varnish to the entire wooden floor of the first floor galleries.of the museum was applied after replacing the damaged wooden planks. Two alluminium ladders for museum for painting, electrical repairs and cleaning work were obtained. A sun-dial discovered from Gaudimoula was acquired for display.

4. GOVERNMENT MUSEUM, GUWAHATI

During the year, the Directorate of Museum, Government of Assam, Guwahati collected terracotta figurines, potsherds and three stone

Plate 158



Salarjung Museum: wooden statue of 19th century, France

Plates 159-160



159



160

*Salarjung Museum:*159, *hour clock, 19th century, England* and
160, *Veiled Rebecca in marble (AD 1876), Italy*

sculptures from the Anthropology Department, Cotton College, Guwahati.

A few pieces of stone objects discovered at Ambari and a few Buddhist motifs in terracotta found in Paglatek, Goalpara district were also collected besides thirty-four silver coins unearthed in Bordowa, Nagaon.

The museum also arranged a lecture on "The Art Heritage of Kashmir" in the Kanakla Barua Auditorium in the State Museum.

5. ZONAL MUSEUM, HISSAR

The sculptures lying in the Zonal museum, Hissar in Haryana were documented. Steps are being taken to display them in the gallery under the direction of D.S. Malik, assisted by C.P. Singh of the Department of Archaeology and Museums, Government of Haryana.

6. SALAR JUNG MUSEUM, HYDERABAD

The Museum is presently commissioning twenty-one galleries and reorganizing twenty-one more. Eleven in western block, ten galleries in the European block and thirty galleries in Indian block. The reorganization of galleries was taken up as per International standards. Two new buildings have come up on either side of the existing museum building-Western Block and Eastern Block. These three buildings were named after the founders of the museum, Mir Yousuf Bhavan, Mir Turab Bhavan, Mir Laiq Bhavan housing Indian, European and Far Eastern collections respectively.

The Western Block was inaugurated with the European Marble gallery along with the lecture hall in the Eastern Block. Reorganization of European galleries, i.e., painting gallery, glass gallery, wood (pi. 158) and metal statuary gallery, clock (pi. 159) and Rebecca (pi. 160), courtyard gallery; Far Eastern galleries, i.e., Japanese and Chinese, are under vigorous progress with which the museum will have fifty-one galleries displaying sixteen to seventeen thousand segregated objects. The museum is going to install sophisticated information technology facilities, like computerized kiosks, touch screen galleries, to enable the visitor to know about the collection of the museum. Computerization of manuscripts and collection has already begun.

The following exhibitions were held during the year: splendors of Asia; fifty years of Supreme Court in India and the Indian Legal System; Contemporary Paintings of Karnataka; Message of Mercy for mankind; and Mobile exhibition on Reminiscence of Diwan Deodhi.

Under the Art Appreciation course, four lectures were arranged besides some general lectures on the role of women in National Integration and Conservation and Environment.

Workshops on "Art and Culture Intellectual Copyright" and "Salar Jung Museum for Tourist Guides" were held.

Apart from these, the museum also organized a seminar on communal harmony; a summer art camp for children besides conducting studies on the pigments on Indian Miniature and Air Pollution in Salar Jung Museum in collaboration with NRLC, Lucknow and NEERI, Nagpur respectively.

7. INDIAN MUSEUM, KOLKATA

During the year, the archaeological section of the Indian Museum, Kolkata, carried out a

number of improvements by renovating the galleries. In the pre and protohistory gallery of the section, the modern technique of rotating the displayed sculptures was adapted. Show cases of Mathura bay was renovated and reorganized. The pedestals of the sculptures displayed in the eastern and southern verandahs of the ground floor of the main museum building was raised and encased with stone, following the scientific methods of modern display. Major thrust was given on the modernization of the Bharhut Gallery as per the following project schedule. Firstly, the existing mosaic tiles were removed for laying new marble floor, all the damaged plaster of walls were chipped off. The damaged windows and doors were repaired and covered with glass panes. Secondly, replicas of wall panels and two gateways were made of fibre reinforced plastic. Lastly, modern and scientific illumination of the gallery along with the exhaust fans were provided. Close circuit TV's and audio visual system were introduced in the galleries.

8. Victoria Memorial Hall, Kolkata

The rich and varied collections housed in the Memorial are being enriched regularly. Setting up of the National Leader's Gallery and collections of other artefacts — Bankim Chandra's writing desk, Mahatma Gandhi's ashes, Jamini Roy's paintings signify that if initial collections were seen as composite representation of empire, the post independence collections could be termed as quest for Indian identity albeit national identity. Maintenance and upkeep of the vast collection of artefacts involve a huge task. The Memorial however, made available fourteen objects for the Travelling Exhibition of Supreme Court of India entitled "Exhibition on fifty years of Supreme Court of India and the Indian Legal System" held at National Museum, New Delhi. Five out often volumes of Simpson's album were conserved and twenty-nine documents of Calcutta High Court were given chemical treatment in connection with Supreme Court Exhibition. The Memorial prepared and supplied seven hundred and ninety-two photographs and Colour transparencies and fourteen hundred sheets/pages of very important documents selected by Umesh Ch. Banerjee, Judge, Supreme Court of India, were photographed for the Golden Jubilee Exhibition of Supreme Court of India. Apart from the above, the Victoria Memorial also prepared and supplied large transparencies in black and white and colour negatives of twenty-five Daniell's water colour paintings, sketches, aquatints, engravings etc. for the purpose of display and illustrations of Indian landscapes in the Cabinet Secretariat, Rashtrapati Bhavan.

With a view to promoting art and culture, the Memorial patronized 'Sit & Draw' and Quiz competitions, organized by Nikhil Banga Nababarsha Utsav Samity. More than six thousand children participated in the said competition. Two other similar events of 'Sit and Draw' and quiz contest were also organized by the employees of the two Nationalized Banks.

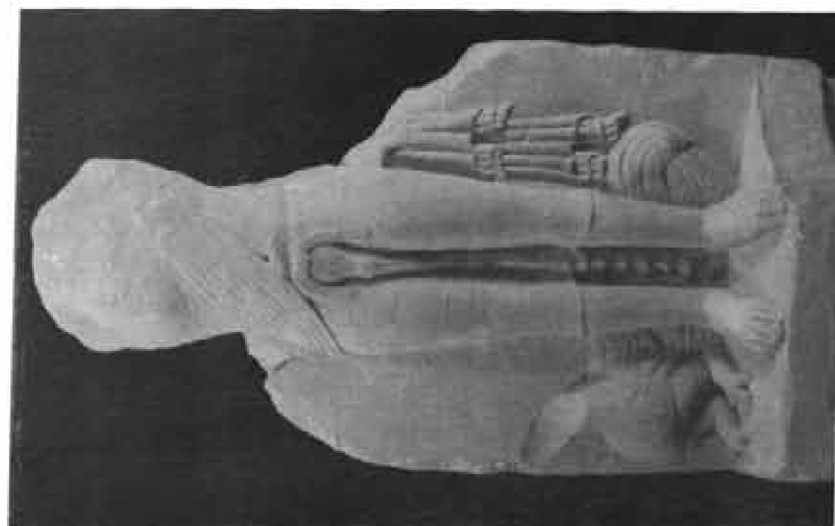
Besides six lectures on various topics, a seminar on "User's Approach to Museum Collections" was arranged and distinguished faculties of Calcutta University, R.B. University, ISI, Calcutta deliberated their views.

The Memorial also installed a traveling exhibition "Judaica" from Israel.

9. Archaeological Museum, Lothal

The background cloth of the showcases was

Plates 161-162



162



161

Government Museum, Mathura: 161, *standing image of Vishnu and* 162, *headless image of Karttikeya*

Plate 163



Government Museum, Mathura : seated Buddha

changed and the antiquities were re-arranged. Two showcases were re-designated as terracotta ornaments and painted pottery *in lieu* of jewellery and pottery sequence, with terracotta ornaments and painted pottery displayed therein. Minor repairs to the showcases, by replacing the decayed plywood, aluminum flats with wooden flats were done. The showcases were provided with labels printed on acrylic sheets instead of old plastic labels. Three maps depicting the pre-Harappan, Mature/Late Harappan and sites with Harappan artefacts were printed on Acrylic sheets and displayed. The pottery collection in Reserve Collection was neatly stacked in plastic crates. The lighting within and outside the museum apart from the amenities for visitors were improved by commissioning the toilet-block and procuring two wooden benches with cushions.

10. GOVERNMENT MUSEUM, MATHURA

During the year under review, forty-five objects were accessioned *viz.,* thirty-five stone sculptures; one bronze; nine terracottas. Of these the following objects deserve special mention.

Standing image of Vishnu (99.11) is represented with his usual ornament, conical diadem, high tiara, garland, an elaborate necklace, a sacred thread, and the folds of drapery slightly indicated on his thigh. The face is slightly damaged with four arms, both the upper right and left, hold the mace and wheel while the lower left a conch-shell *{sankha).* On both the sides there are representation of decorated pillars and motifs and inscriptions on both the sides of the feet in Devanagari script. The image (34 X 21 cm) from Village Aberni, Mathura is in black stone and belongs to the late medieval period (pl. 161).

The headless image of Karttikeya (99.24) with arms broken comes from the Village Mora, Mathura. The image wears a drapery which touches his knee. A headless cock is found seated near his feet. The back side also shows a damaged figure of Karttikeya. The seated cock figure is also noticeable on the reverse side of the image. The image in red sandstone (99 X 48 cm) belongs to Gupta period (pl. 162).

Another headless image of the Buddha (51 x 40.5 cm) in red sandstone seated cross-legged on a lion throne, from a site near M.E.S Colony. Mathura, belongs to the Kushan period. The image with damaged arms has the folds of drapery covering his left shoulder. There are symbols on both the feet with a Banyan tree which is carved on the back side of the image (pl. 163).

11. PRINCE OF WALES MUSEUM, MUMBAI

The Museum acquired two antiquities during the year. The collection includes two silk sarees, one Patola from Patan (99.1/1) and the other from Ghatchola (99.1/2), Gujarat.

A total number of seven hundred and twenty-seven new books and one hundred and ninety periodicals were added to the research library. Six hundred and twelve research scholars made use of the library facilities during the year. Saryu Doshi, delivered a lecture on "Raja Ravi Varma - His life and painting". The Prince of Wales Museum of Western India and the Consulate General of Israel in Mumbai, jointly hosted an exhibition entitled, "The City of David" from the Institute of Archaeology, Hebrew University of Jerusalem, Israel.

The Prince of Wales Museum of Western India hosted an exhibition entitled, "Past and Present: Stone Bead Making in India" from the Department of Archaeology, M.S. University of Baroda. To coincide with this exhibition, a demonstration of bead making by artisans from Khambat was arranged.

Slide shows, gallery tours from school and college students were also organized by the Museum from time-to-time, thematic displays on various topics like Krishna; Ganesa; Pagdis - Turbans of India; Devi - the Mother Goddess; Lamps of India.

During the year under review, two gallery trails of children were brought out. One was for the sculpture gallery and the other for the bird gallery of the Natural History Section.

The Museum was visited by Prof. Osvaldo Svanascim, Director, National Museum of Oriental Art, Argentina, besides delegates of the Australia-India Council anda delegation from the Republic of China (under the aegis of the Reserve Bank of India); High Level Cultural delegation from Netherlands; H.H. Dalai Lama for opening a photographic exhibition on Tibet; an Australian delegation led by Alexander Downer a minister in the Australian Cabinet; apart from a group of the "Friends of the Smithsonian Institution" USA, consisting of distinguished benefactors of the Institution.

12. HAZARDUARI PALACE MUSEUM, MURSHIDABAD.

During the period under review, preservation and restoration of important old records, maps, *farmans,* were taken up along with the binding, lamination of old books and manuscripts. Documentation and accessioning of objects and antiquities of the museum were done along with the preparation of labels and charts for the objects/ antiquities in the galleries. For security purpose close circuit TV was installed along with the infra-red beam barrier system. Movable showcases and moulded glass showcases were prepared in the Hall of Royal Exhibits and Western Drawing Room for the display of objects/antiquities in the museum. Organization of two archival galleries are in rapid progress.

13. ARCHAEOLOGICAL MUSEUM, JAJPUR, RATNAGIRI

In the year under review windows, doors, skylight including the glass panes were repaired. The exterior and interior sides of the entire museum building were repainted. The security lamps around the museum building which were blown off during super cyclone were restored by installing new Sodium Vapour Lamp with new cable fittings. The Brass Letter Board in front of the museum was repaired. The iron objects displayed in Gallery 4 were chemically treated. The garden in front of the museum was once again brought to its original position by plantation of trees and regular watering.

VII ARCHITECTURAL SURVEY

TEMPLE SURVEY (NORTHERN REGION)

The Temple Survey Project (Northern Region), under K.K. Ramamurthy, started collecting the data on the availability of the brick/terracotta temples in north India, under the programme Architectural Survey of Temples. According to the available data, such temples are widely spread in Chhattisgarh region of Madhya Pradesh, Prachi Valley area of Orissa and whole of Bengal. To start with, a preliminary survey of such temples was conducted in Madhya Pradesh region with the type sites at Pawaya, Khajuraho, Karsua, Dihhwara and Bilheri. The salient features of the architectural model are enumerated hereunder.

The village Pawaya (District Gwalior, 25° 46' N; 78° 17' E) is located on the confluence of Sindh and Parvati rivers and about 64 km south-west of Gwalior. The place was identified with the ancient Padmavati, the capital of the Naga dynasty. The name was also referred to in *Vishnupurana* and in *Malatimadhava* of Bhavabhuti. The excavation conducted at the site revealed the existence of a three-tiered solid brick platform built one above the other, receding in suitable proportion. It appears that the top level structure originally might have served as *garbhagriha* while the lower platforms served the purpose of *pradakshina-patha.* In length the lower platform measures 43 m and the middle one is 17 m. Both the platforms are raised to a height of 9 m. These platforms were originally decorated with terracotta panels. The wall portion of the upper platform was artistically carved with horizontal mouldings, relieved by *purnaghata* motif flanked by pilasters at regular intervals. The used brick measures 45x23x7 cm. The inscription at the place records the installation of an image of Manibhadra by the king Sivanandi. The site has yielded a good number of antiquities like Manibhadra, Trivikrama, *torana* lintels, palm capital, etc. It is surmised that the site was a flourishing centre for the Hidnu pantheon from early Christian era to the late Gupta period and the temple was probably originally dedicated to the *Bhagavata* cult.

The excavated brick temple-complex at Khajuraho (District Chhatarpur) is located on the eastern side of the western group of monuments. The structures were built over a common rectangular *jagati* and a series of sub-shrines are also constructed on the outer fringe. The center is occupied with four shrines and all of them are facing east. On plan they have, a *garbhagriha, antarala* and *mandapa.* Interestingly, they also exhibit *triratha* and *gajaprishtha* ground plan. The shrine for Mahishamardini was positioned on the western slope of the mound. The *adhishthana* mouldings consist of *pitha, khura, kumbha* and *kalasq,* and the shrine still preserves the intact *chandrasila.* The brick debris all around justifies that originally the whole complex was covered with a brick *prakara.* Various antiquities like

Vishnu, Mahishamardini, Ganga-Yamuna, Dvarapalakas, etc., have come to light. For construction, various sizes of burnt-bricks were used, measuring 40x23x7; 38x23x7 and 23x23x6 cm. From the available evidence, based on sculptures and structure, the temple activities at the place might have been started during the period of Paramaras and enlarged in the region of Chandellas.

The brick temple at Karsua (District Sidhi), located 38 km from Waidhan, locally known as Madfedand temple, is dedicated to Siva. The west facing temple on plan has preserved only the *garbhagriha* portion, the other component parts like *antarala* and *mandapa* had already been collapsed. On elevation it has well preserved *adhishthana, jangha* and *sikhara.* The *garbhagriha* is square and enshrines the *linga.* The mouldings on *adhishthana* are in badly damaged condition. The non-ornamental *jangha* raised to height of 1.60 m. The eastern side of the *sikhara* has notable architectural and stylistic features. The *sikhara* portion was adorned with *chaitya* motif and pilasters by utilizing cut and chamfered bricks (pi. 164). The size of the bricks used in construction variously measures to 37x23x6 and 28x22x6 cm. Interestingly, the height ratio of the *adhishthana, jangha, sikhara,* roughly corresponds to 1:1:4. On stylistic ground the temple may be ascribable to the sixth century AD, possibly of the late Gupta period. The excavated brick temple, probably dedicated to Vishnu is noticed in the village Dihhwara (District Katni, 23° 55' N; 80° 25' E) and is located about 16 km on Katni-Vijayaragava Road. The east facing temple is built over a high *jagati* (pl. 165). The *garbhagriha* is square and measuring 3 m in inner side. The other axilary parts like *antarala* and *mandapas* are in badly damaged condition. The brick *jagati* contains the usual mouldings of *upapitha, pitha, kantha, vedibandha* and *kumuda.* The *jagati* measures in length 23.35 m on east-west and 15 m on north-south direction. Different sizes of bricks were utilized for the construction, measuring 32 X 20 X 6; 35 X 22 X 6 and 36 X 22 X 6 cm. The temple may be assignable to the fifth century AD on stylistic ground.

The Vishnu Varaha and Tapasvimatha are situated in the village Bilheri on Katni-Jabalpur Road (District Katni). The original stone temple of Varaha was constructed by the Chedi kings in eleventh century AD. The *garbhagriha* portion was totally converted and reconstructed in brick and stucco medium. The temple is noted for exquisite Brahmanical and Jaina sculptures. The Tapasvimatha Siva Temple exhibits the Indo-Islamic architecture, probably renovated during the seventeenth century. The doorway and curvilinear ceiling of the temple are painted with floral designs.

BUILDING SURVEY PROJECT (NORTH)

The Building Survey Project (North) of the Survey, taken up the study and documentation of wooden architecture *viz.,* temple-Havelis and houses in Ahmedabad under the direction of O.N. Chawhan, assisted by V.S. Badiger, Sudhir Kumar, Shakeel Ahmed and Jatinder Kumar.

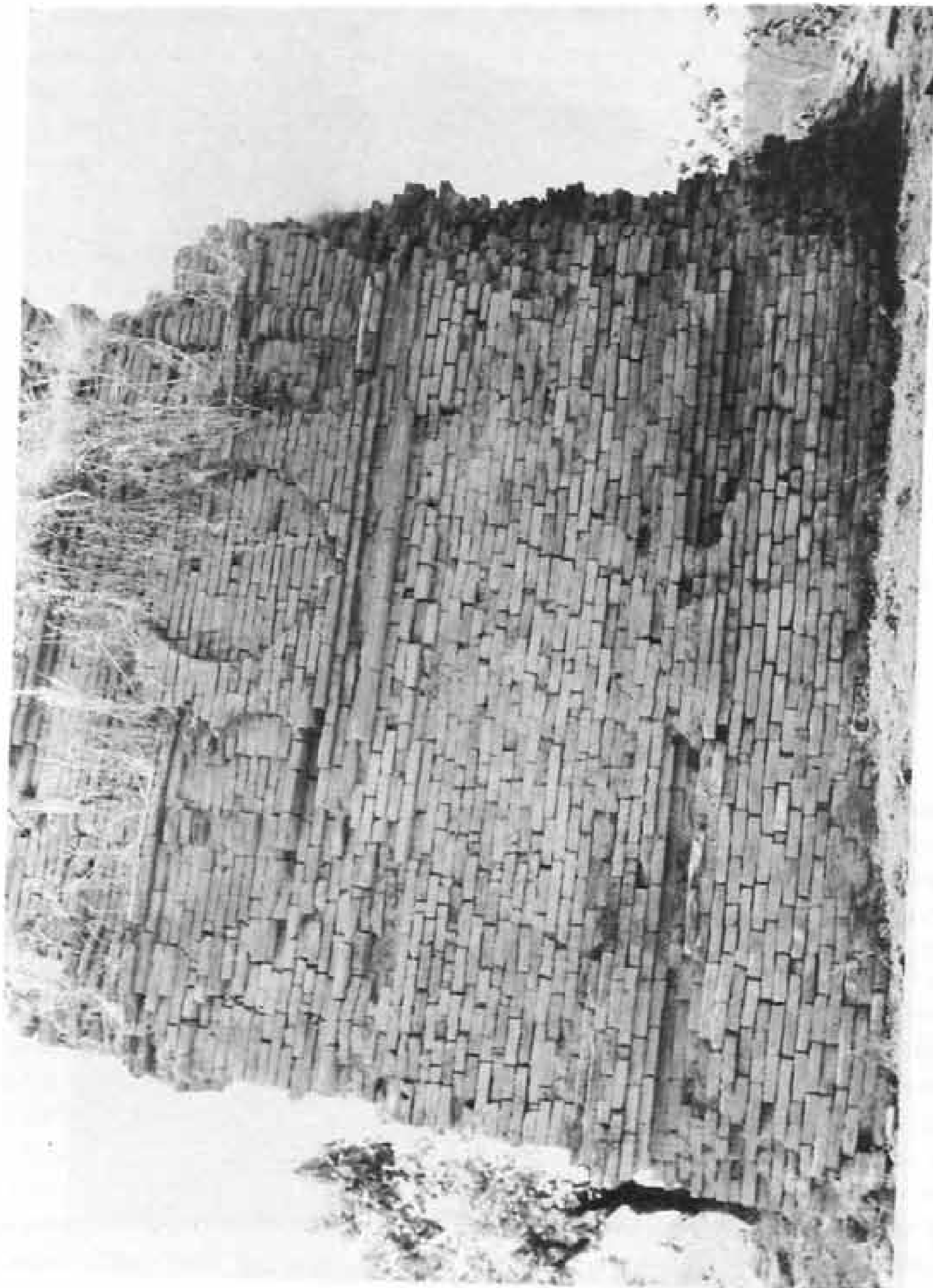
The old localities of Ahmedabad were found to be of great architectural interest. Some of the superstructures of Havelis are double-or triple-storeyed, having notable combination of wooden and brick constructions, besides delicate carvings, ornamented brackets and balconies with fine wooden screens. A few of them were found to have mural paintings with floral motifs and figures. These houses are occupied by the owners

Plate 164



Karsua: brick temple of Siva, view from west

Plate 165



Karsua: brick temple of Siva, view from east

Plate 166



Balaji Mandir Haveli: jharokha

Plate 167



Praffula Chandra Purushottam Patel Haveli : pillar with brackets

Plate 168



Maganbhai Haveli : façade

or their tenants, as a result, the work pertaining to documentation of the interiors, could not be possible. However, as far as possible the outer facade and ornamentation on the entrance and balconies were properly documented. The wooden architecture of these buildings exhibits an intermingling of Hindu, Mughal, Maratha and Colonial style. Some of them were found to be of archaeological and architectural interest, which are briefly noted here. All the following buildings are approximately datable between the eighteenth and ninteenth century.

The eighteenth century Dwarakadhish Temple-Haveli at Raipur is remarkable for its architectural elegance. Built over a masonry platform of 1.22 m height with seven steps at the entrance. It has all the features of a residence, while the ground floor houses the shrine, dedicated to Dwarakadhish-the celebrated form of Lord Krishna. The inner doorways are surrounded by bands of decorative motifs and there are small figurines of goddess Lakshmi in the middle of the lintels. The painted murals in the outer verandah depicting *Krishnalila* episodes were probably added much later as evident from their fresh looks. The brackets are carved with foliage and plant designs. The struts with graceful decoration of angles are noteworthy. The first floor has the curvilinear balustrade and above it there is a flat carved panel with rosettes. Each uprights of the balustrade has a standing male figure with club in his hand. The window glass panes are however, later additions.

The Swaminarayan Temple-Haveli is one of the largest and most flourishing Hindu sanctuaries in this city. It was built in neo-Mughal and Maratha style in AD 1822. The main entrance on the west is in neo-Mughal style, with triple projecting balconies and a fluted dome over the arched-entrance, which is 22 m high and 14 m wide approximately. The wooden doors are strengthened with iron straps, knobs and pointed nails for security. The multi-storeyed adjacent wooden Haveli buildings are traditionally constructed with decoration. The cast iron-balconies and the gabled roofs are recent additions. The north side multi-storeyed wooden building has a large open hall at the ground floor, which is used for congregational prayers and sermons. The frontal pillars of the northern *sabha-mandapa* was raised on a carved stone base with rich carvings upto the capital. Their capitals are decorated with beads, birds, and human figures. The delicately-carved floral patterns on the face of the column are the finest examples in Ahmedabad. The richly-carved struts are supporting the beam-end and projecting the floor above. The beam above the pillars have delicate designs of miniature elephant, birds, petal and leaves. Here the main attraction is the richly-and very beautifully-carved typical Gujarati brackets with minute floral designs. Some of these are profusely carved with the figures of warrior, Ganesa and Hanumana along with other minor figures and animals. Some of the exceptional features comprise multiple number of storeyes, the roof pavilions and projections to the roof probably borrowed from the colonial architecture. Each storey except the one below has a long running verandah with rows of columns and brackets. The upper floors with arched spandrels between the columns appear to be an offshoot of Mughal architecture.

The ceremonial *jharokha* and the cantilivered balconies are characteristics of the royal residence. These were common in Rajput and Mughal palaces, but its execution in wood is

unique in Gujarat. Here the *jharokha* of Balaji mandir Haveli at Dholki pole is an excellent example of artistic tradition of Gujarat (pl. 166). It is decorated with lattice work in floral design. The pendants, fluted pillars, arched spandrels have added beauty to this *jharokha*. This is the oldest wooden structure in this temple-Haveli but today in a dilapidated condition due to weather action.

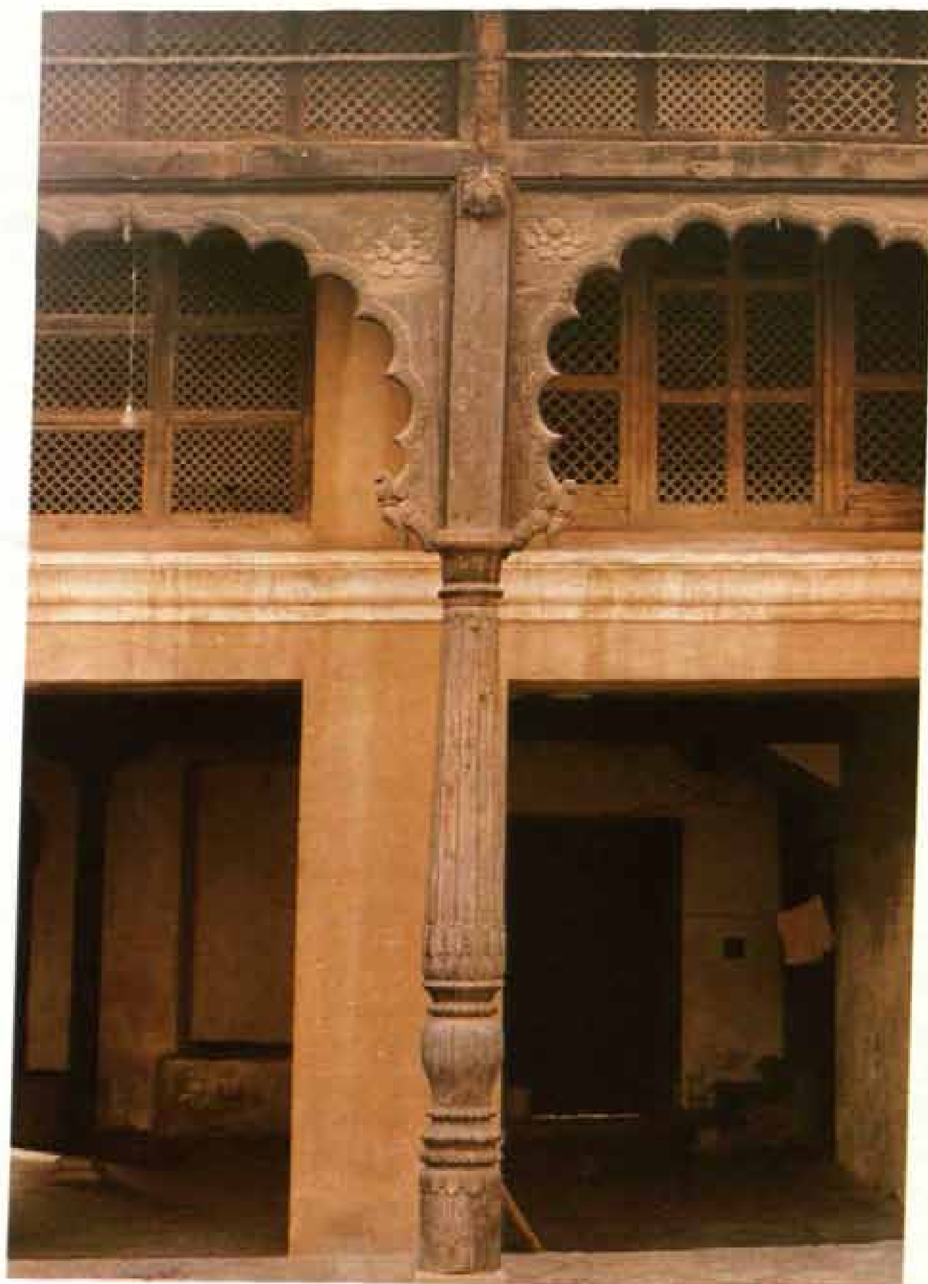
The Svetambara Parsvanatha Jaina Temple located at Manviki pole is probably three hundred years old, which resembles Sammek Shikharji of Jaina sect. The entire wooden structure is 4.57 m (approxmately) in height with square base. On it the superstructure was raised in octagonal design with each sides measuring 2.8 m and upto 0.91 m height. The entire structure is a replica in wood, designed as artificial hill, measuring 11.93 m in circumference with 3:81 m height. In the center of it is located a floral shrine. This shrine has a number of carved small shrines at all cardinal directions with figures of devotees, animals, heavenly dancers, etc. The whole shrine has a shaft in the center upon which the shrine used to rotate in the past, but this system is presently out of order. All these structures are painted with oil colours.

Among the most striking examples of wooden architecture of traditional Gujarati Havelis, the one belonging to Shri Prafulla-Chandra Purushottam Patel, located at Surdas-seth-ki-pole is notable. This Haveli has two-storeyed structure raised on a platform with rectangular plan. The main entrance is embellished with floral carvings including *kalasa* in the middle of the lintel. The doors, pillars and brackets are in traditionally Gujarati style (pl. 167). The Haveli consists of a central courtyard (3.04 X 3.04 m approximately), surrounded by four sides with double-storyed rooms. It is a miniature prototype of large Haveli in plan and elevation. The lintels of all doors except *puja* rooms have *kalasa* in the center but *puja* room bears the figure of Ganesa. The pillars inside the hall rest on wooden bases with intricate carvings. The British style open string-wooden staircase and almirahs in hall probably belong to the Colonial period, while on the basis of the style of construction use of building materials, besides the present condition of the Haveli, this could be assignable to the last phase of nineteenth century.

The Maganbhai Haveli is situated at Raipur. The royal entrance is approximately 3.04 m in width and use of ledges and battens superimposed upon a layer of planks, the hole joined together with spikes. The richness of wooden ornamentation is conspicuous on its main facade of two storeyes (pl. 168). The balustrade has a carved centerpiece with rows of elephant heads followed by a carved beam. Some figurines between these are excellent examples of artistic tradition of Gujarat. The Haveli consists of two open verandahs. The lintel of the door nearby the main entrance in first verandah is carved with Siva in meditation, seated in *padmasana*. Both his hands are placed on his knees while the rear left has a *trisula* or trident and the rear right hand carries a club. The tall fluted pillars of second verandah are raised on stone bases.

The arched-spandrels between the columns are typically Islamic (pl. 169). The Haveli consists of two courtyards (4.57 m approximately) and every piece of wood on four sides is carved

Plate 169



Maganbhai Haveli : fluted pillar

Plate 170



Devendrabhai Nagar shop: pillar

with floral and plant designs with dancers, musicians, warriors, birds etc. The better preserved Haveli presently owned by 'The Sarabhai Trust of Calico Museum' is used *for yoga* classes.

The house of Manubhai Bapalal Dalai at Zaveri pole is another example of artistic tradition of Gujarat. The profusely decorated *todla* or *tolla* of the door-frame bears elephant head with a bird on its trunk which is one of the characteristics of traditional Gujarati style. Here the pillars, capitals, struts, beam-ends, friezes, balustrade and window panels etc. of the facade are richly carved and painted in yellow.

During the survey of Colonial buildings, various types of pillars have come to light. Of these, the first type consists of a square in lower, hexagonal in the middle and round in the upper portions. It appears to be taller than the usual ones with Corinthian style of capitals. The floral, foliage and chain designs are carved in small size on these pillars. The second type, the pedestalled, fluted and shaft pillars with Corinthian capitals are seen in the house of Pankajbhai Verma at Kuva-vala-kacha and in other localities of the city. The third is different from the above pillars as noticed in Devendra Nagar's shop at Raipur. Here the round-shaped pillars are carved with designs in the shape of iron chain (pl. 170). There is a panel above the beam containing the floral, plant and human decoration in European style. The fourth style of pillar, reported from Hemanthbhai Zaveri's place at Doshiwadni pole, indicate twisted rope design having square base -the four edges of which is clearly traceable. The capital above it is beautifully carved with the faces of goats. The fifth variety of pillars in M.K. Dave's house show tiger-faced panel on the capital. The carving of human faces on the panel above the beam are reported from Arunbhai Ingwala's house. The Saracenic influence could be easily noticed from the panel with floral and plant designs, carved on the upper portion of the door of Bhashankar Solicitar's Haveli. The iron balustrade and other characteristics which were used in colonial period may be seen in the wooden architecture at Ahmedabad.

VIII. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

AGRA CIRCLE

UTTAR PRADESH

I. AGRA FORT, AGRA, DISTRICT AGRA

At the south gate of Diwan-i-Am, the work of damaged and missing *lakhauri* brickwork and lime-plaster was attended to. The diamond cut designs on the ceiling of the arch of the gate were repaired and finished with special lime-mortar. The floors were repaired with lime-cement-concrete and red sand-stone surface with stained cement pointing.

At the Anguri Bagh, stained cement pointing work with mortar (1 : 2 : cement: coarse sand) on red sandstone and stained cement pointing with special lime-mortar was carried out on marble stone flooring.

2. AKBAR'S TOMB, SIKANDARA, AGRA, DISTRICT AGRA

At the main mausoleum, the old and decayed lime-plaster was carefully removed and provided with hand grinded special lime-mortar (gum, belgiri, marble dust, lime, etc.) over a base of 10 cm thick lime-plaster (1 : 1 : 2 : 2 : cement: lime : *surkhi*: coarse sand). The Mughal pattern doors were also provided around the main mausoleum for the graves located in the cells.

3. BURIA-KA-TAL, ETMADPUR, DISTRICT AGRA

The work of underpinning was carried out at parapet and staircase with brick tile and *lakhauri* bricks. At the dome and parapet, vegetational growth was removed and these were replastered.

4. GREAT IDGAH, AGRA, DISTRICT AGRA

At the Idgah, the damaged and decayed portion of battlemented and decorated western enclosure wall was underpinned with lime-mortar (1 : 1 : 3 : 3 : cement: lime : *surkhi*: coarse sand) (pls. 171-172). The surface plaster, which was found decayed and bulged-out, was removed and replastered with lime-plaster. The old and decayed red sandstone flooring of prayer hall, ceiling, facade were restored and pointed with stained cement-mortar (1 : 2 : cement: sand with colouring pigment).

5. GROUP OF MONUMENTS, FATEHPUR , SIKRI, DISTRICT AGRA

The Anup Talao is one of the best- executed architectural structures inside the palace-complex at Fatehpur Sikri. The contemporary literary references mention that an unsuccessful attempt was made at Fatehpur Sikri by a certain Hakim to construct an underground chamber surrounded on all sides with water. The said structure could not be identified till date. During the course of investigations at Anup Talao, it was noticed that the present flooring is not original and water was seeping through the cracks. In order to prevent the water seepage affecting Anup Talao, and the surrounding palace-complex, a portion of the flooring was removed for repairs and found the original steps descending down. The debris consisting of stones, boulders and rubble were

Plates 171-172



171



172

Great Idgah, Agra, damaged western boundary wall: 171, *before* and 172, *after conservation*

removed and chambers under the central platform and to the east of it were discovered. The chamber to the east of central platform is plastered with lime and a ventilator noticed on the top. The debris and rubble were removed on an east-west axis and found the above structures. The exposed red sandstone veneering stones of central chamber were provided with recessed cement pointing 1:2: cement: sand) and red oxide as pigment and recessed lime-pointing (1 : 1 : 2 : 2 : lime : cement: *surkhi:* sand) was also provided to prevent water seepage.

At the Diwan-i-Am quadrangle, pathways are provided with finely dressed red sandstone in-between the garden layout. To prevent seepage of water in-between, recessed stained cement pointing (1:2: cement : sand) with red oxide was done. Due to rusting and expansion of iron dowels used in construction, some of the red sandstone ornamental brackets and slab stones found badly decayed and broken, were replaced with the new ones matching the original.

The leaky and deteriorated roof concrete of Diwan-i-Am, Panch Mahal, Khwabgah, Diwan-i-Khass *(ekastambha* building) were watertightened by recessed cement-pointing, lime-concreting and grouting the deep holes, etc. The moulded and carved plaster of walls and niches were also repaired with recessed cement pointing.

At the Diwan-i-Am, the steps were restored as per original. At places where the entry was closed, a fine-dressed, table-rubbed, hexagonal geometrical designed red sandstone *jali* was provided with *muttaka* on either side matching the original.

The Hakim house is a three-storeyed structure, constructed in different phases. The additions and alterations were being made at different phases and it was one such addition, which fell down in 1996. The collapsed portion include architectural members like red sandstone pillars, brackets, lintels ceiling beams, rubble masonry walls, etc. The work of removing the debris was carried out and the entire area was cleared for further restoration.

At the octagonal Baoli near Shah Culi Road, the damaged and decayed veneering red sandstones and *dab* stones (horizontal and vertical strings) were replaced with new ones. The joints were provided with recessed stained pointing with mortar (1:2: cement: sand) mixed with red oxide.

At the Jami Masjid, the roof portion is ornamented with more than hundred small *chhatris.* The domes of these *chhatris* were provided with lime-plaster. The old and decayed lime-plaster from the domes *of chhatris* and the dome of Nawab Islam Khan's tomb was removed, the cracks filled with grouting the lime and cement mixture under pressure, replastered and pointed. At the tomb of Nawab Islam Khan, the inverted lotus motif in red sandstone below the pinnacle was also replaced. At the south-east and north-east *chhatri,* the decayed and damaged *chhajja* was also replaced.

At the excavated remains to the north of so-called 'mint' horse stable is also located. The horse stable is provided with mangers for feeding the horses, which were found damaged and decayed. The broken and damaged portion of the mangers was reconstructed with random rubble stone masonry with lime-mortar. The exposed surface was also pointed, the cracks grouted and plastered.

6. ITIMAIM D-DAULA'S TOMB, AGRA, DISTRICT AGRA

The Itimad-ud-Daula's Tomb is an excellent

example *of the pie tra dura* decoration with profuse work in semi-precious stones both on white marble and red sandstone. The main mausoleum is of white marble and the gateways and riverside *baradari* is of red sandstone with inlaid decoration. The missing and deteriorated inlaid decorations at many portions of the main mausoleum, north gate and main gate, were replaced as per original. Most of the inlaid decorative stones are of geometrical pattern and these were prepared using traditional techniques.

Along the River Yamuna, a *baradari* with platform on either side could be seen. The platform is provided with a red sandstone railing and *dasa* stones. The red sandstone railing and *dasa* stones found deteriorated at many places, affected due to passage of time, were replaced with new ones as per the original pattern and decoration.

The red sandstone pathway around the main mausoleum serve as a partition between the gardens as well as approach to the riverfront and gateways. The western pathway between the main mausoleum and western false gateway was found bulged and at many places the red sandstone slabs were either worn-out or missing. The missing and bulged-out red sandstone slabs were replaced with new ones and watertightened with mortar. The bulged-out *dasa* stone was also reset after removing the vegetational growth.

7. JAMi MASJID, AGRA, DISTRICT AGRA

At the ceiling of prayer hall, lime-cement plasterwork was carried out with lime-mortar (1:1:4: cement: lime : coarse sand) mixed with red oxide. The damaged red sandstone flooring was replaced and pointed with stained cement mixed with red oxide.

8. KALA GUMBAD NEAR CHINI-KA-RAUZA, DISTRICT AGRA

The main building and platform of the tomb, situated south-west of Chini-ka-Rauza, on the left bank of River Yamuna found deteriorated with masonry missing at places were attended to by underpinning with brick tile and *lakhauri* brick. The replastering of the dome and parapet wall was done on all sides.

9. KANS GATE, GOKULPURA, AGRA, DISTRICT AGRA

The lime-plaster over *lakhauri* brick surface was found bulged and missing at many places of the gate of late Mughal period. The red sandstone *chhajja* stones of the *chhatris* were also found missing at some places. The decayed and missing lime-plaster was replastered and the *chhajja* stones were also replaced.

10. KOS MINARS, AGRA-MATHURA ROAD, AGRA, DISTRICT AGRA

The Minars were provided with mild steel iron railing all around over a plinth *of lakhauri* brick. The decayed and damaged outer surface of Kos Minars was also replastered.

11. RAM BAGH, AGRA, DISTRICT AGRA

The first and foremost architectural adventure of the Mughals at Agra is the Aram Bagh or the Ram Bagh originally called as Bagh-i-Nur Afsan. The garden-complex is set in terraces and in-between is provided with pavilions, tanks, underground chambers, pathways, fountains, etc. The deteriorated and missing red sandstone pinnacle, *chhajja* of south-east, south-west and central *burj* in the southern side of Ram Bagh were replaced with new ones as per

the original. The decayed plaster of the *burj* was also replastered.

12. SMALL MOSQUE IN CHURCH OF MISSIONARY COMPOUND, SIKANDARA, AGRA, DISTRICT AGRA

The damaged and broken boundary wall was underpinned with *lakhauri* bricks and lime-mortar (1:1:3:3: cement: lime : *surkhi*: coarse sand). The decayed lime-plaster of intrados and extrados was also removed and replastered with lime-mortar (1:1:2:2: cement: lime : *surkhi:* coarse sand).

13. TAJ MAHAL, AGRA, DISTRICT AGRA

At the terrace of main mausoleum of Taj Mahal, the stained cement pointing with special lime-mortar was taken up on the white marble portions along with cement pointing mixed with red oxide on red sandstone portions. The pointing work was done on red sandstone portions like pillars in the facade, brackets, arches and *dalans* on the terrace.

The deteriorated *lakhauri* brick masonry work of dome of the Kali Masjid, located to the east of the Taj Mahal and the broken and missing white marble pinnacles were repaired by underpinning and plastering the intrados and extrados with lime-cement mortar. The missing white marble pinnacles were also replaced with new ones as per the original.

The stained cement pointing at the eastern *dalans* of Taj Mahal was done and the missing, decayed ornamental stones were replaced with new ones as per the original by removing the old ones.

At many places of the facade of the main mausoleum, the missing inlay stones were replaced with the original as well as the new ones.

At the eastern water pavilion (Naubat Khana) stained cement pointing on the wall, joints of brackets, arches was done with mortar in the ratio of 1: 2 : cement: coarse sand mixed with red oxide.

14. IKHLAS KHAN'S TOMB, BADAUN, DISTRICT BADAUN

The dome of Ikhlas Khan's Tomb which had fallen due to deterioration and water seepage into the *lakhauri* brick core was taken up for reconstruction. The 90 cm thick *lakhauri* brick core was initially taken up for reconstruction as per the original dome pattern. The entire dome was thus reconstructed with proper interlocking arrangements originally existed. Then lime-plastering was carried out with a mortar (1 : 2 : 2 : 2 : cement: lime : *surkhi*: coarse sand) on both, intrados and extrados. The small minars originating at the corners from the first storey was also repaired and replastered. The alcoves, niches on the wall surface were executed separately as per the original. The ornamental and floral designs existed on the wall surface was also reproduced as per the original.

15. SIVA TEMPLE, LAKHAMANDAL, DISTRICT DKHRADUN

At the Siva Temple of Lakhamandal in tehsil Chakrata the boundary wall was provided with a random rubble masonry boundary wall and an iron railing over it.

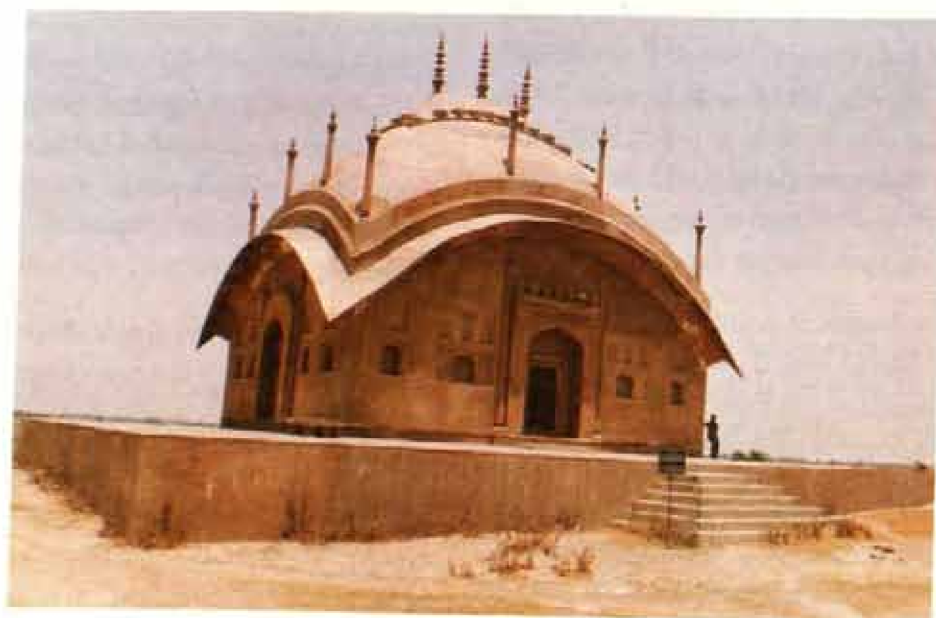
16. TOMB OF RASHID KHAN, MAU RASHIDABAD, TEHSIL KAYAMGANJ, DISTRICT FARRUKHABAD

The tomb of Rashid Khan is executed in the Bengali roof style over a rectangular building (pls. 173-174). The wall portion is executed with floral designs in lime-plaster at regular intervals. The *chhajja* and the turrets are in red sandstone and is an excellent example of the late Mughal architecture. The plaster of the walls was found decayed, the

Plates 173-174



173



174

Tomb of Nawab Rashid Khan, Mau Rashidabad: 173, *before* and 174, *after conservation*

chhajjas broken and fallen down, the turrets with the *guldasta* pinnacles were leaning due to cracks developed on the roof. The southeastern corner of the roof was completely missing and red sandstone *chhajja* was precariously hanging. Hence, massive conservation work was carried out at this tomb. The roof concrete which was found decayed and dead was removed completely and provided with new one with mortar (1 : 5 : 5 : 5 : cement: lime : *surkhi:* coarse sand). The ornamental designs over lime work were also carried out and four missing free standing turrets on the roof were replaced with new ones. The *chhajjas,* which were broken, were also replaced. The decayed lime-plaster on the walls were also removed and provided with new one with lime-mortar (1 : 1 : 3 : 3 : cement : lime : *surkhi:* coarse sand). The ornamental designs over lime work were also carried out and four missing free standing turrets on the roof were replaced with new ones. The broken *chhajjas,* were also removed and provided with new lime-mortar (1 : 1 : 3 : 3 :) cement: lime : *surkhi:* corse sand. The ornamental and floral designs were also executed wherever found missing. All around the tomb a high raised platform of *kankar* stone originally existed. The platform with the steps leading to the tomb on western side was also found damaged and missing at many places. The missing and damaged portion of the platform was also restored and the floor was provided with *lakhauri* bricks and plastered with lime-mortar (1 : 1 : 3 : 3 : cement: lime : *surkhi*: coarse sand).

17. MOSQUE AND TOMB OF MAKHDUM JAHANIAN, KANNAUJ, DISTRICT KANNAUJ

The southern retaining wall of the mosque collapsed due to water seepage and development of cracks which was made of fine-dressed sandstone, buff and cream in colour. The collapsed portion was nearly 120 m in length and 90 m in height. The thickness at the bottom was 7.5 m and 3 m at the top. Initially, the fallen and collapsed portion was cleared, original stones were sorted out and selected to be reused in the reconstruction. The filling inside the retaining wall was done with already available material and the reconstruction of retaining wall was carried out. The stones were laid with a mortar (1 : 1 : 3 : 3 : lime: cement: coarse sand : *surkhi).* Wherever ornamental members and mouldings were noticed on the sandstone surface they were preserved and reproduced in case of the broken stone blocks. After completion of the reconstruction of boundary wall, the lime-concreting was done on the top and in front of the mosque with mortar (1 : 5 : 5 : 5 : cement: lime: *surkhi*: coarse sand).

AURANGABAD CIRCLE

MAHARASHTRA

18 AJANTA CAVES, AJANTA, DISTRICT AURANGABAD

A retaining wall in U.C.R. masonry along with widening of pathway and parapet wall was reconstructed matching the original rock texture near Cave I and in front of Cave 7 for visitor's facility. The GI. pipe railing in three rows was provided for the safety of the visitors.

19. DAULTABAD FORT, DAIULTABAD, DISTRICT AURANGABAD

The main pathway was laid with stone pavement and the damaged retaining wall along with main pathway was reconstructed. The steps of Sarasvati well were repaired and desilted.

20. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

A dwarf wall was constructed in front of Caves 1 to 5 and 10 to 14 and provided with G.I. pipe

railing for the safety of the tourists. Construction of retaining wall was taken up in front of Caves 10 to 14. Widening of pathway duly supported by retaining wall in front of Caves 17 to 21 was completed.

21. GHRISHNESHVARA TEMPLE, ELLORA, DISTRICT AURANGABAD

Reconstruction of compound wall was carried out.

22. MALIK AMBAR'S TOMB, KHULTABAD, DISTRICT AURANGABAD

The damaged and out-of-plumb compound wall was reconstructed. The roof of the tomb was watertightened, the courtyard was levelled and the old store room was repaired.

23. GAIMUKH TEMPLE, LONAR, DISTRICT BULDHANA

Construction of retaining wall in front of the *tirtha* is in progress.

24. PA.NHALA FORT, PANHALA, DISTRICT KOLHAPUR

The degenerated and weathered roof of Teen Darwaza was removed. Roof was grouted with cement slurry mixed with waterproof compound. After filling the cracks and cavities the rooftop was plastered. The damaged and missing parapet wall all around the roof was reconstructed as per original.

The degenerated dead lime-mortar was also removed from roof of the Ambar Khana and was provided with lime-mortar as per original. The roof was replaced by the new glass shed.

25. MAHADEV TEMPLE ZODAGA, DISTRICT NASIK

The damaged Nandi basement was restored with stone masonry. Repairs to the entrance steps of *mandapa* were carried out. The underpinning and pointing was done to the plinth portion of the temple.

The watertightening was done to the damaged roof-terrace of the temple by removing the dead plaster carefully.

26. PANDAVLENA CAVES. NASIK, DISTRICT NASIK

The work of retaining wall, in front of Cave 10 was completed. The approach pathway was provided with rubble masonry. At the foothill the store-cum-office was provided with entrance gate and chain link fencing.

27. BHULESVARA TEMPLE, MALSIRAS, DISTRICT PUNE

Area around the temple was levelled. The out-of-plumb pillars were restored to the original position. Recess pointing was done to the steps, platform and pathway in front of the temple. Stone flooring was laid out around the temple. The cavities and cracks to the *roof of mandapa* were filled in with lime-cement and brickbats. Dry U.C.R. wall on either side of the temple was also provided.

28. KARLA CAVES, KARLA, DISTRICT PUNE

During the period under review, a retaining wall around the monument in U.C.R. stones and cement mortar was provided.

29. SHANIWARWADA, PUNE, DISTRICT PUNE

The disturbed and fallen back wall of the fortification was restored in plumb and alignment. Damaged and missing portion of the drainage system was repaired as per original. The decayed and damaged portion of the wooden door, new wooden barricade and *jali* were provided to the Nagarkhana and Pushkarini tank. The bulged and out-of-plumb wall of Peshwa's godown was also attended to. The sunken stone flooring was replaced on the pathway leading to the spectator gallery.

30. JIJAMATA WADA, PACHOD, DISTRICT RAIGAD

The dilapidated and damaged wall structure of mud-mortar was replaced as per original. The pointing was done from inner side to the fortification wall. The top portion of the wall was watertightened and grill gate was provided beside removing the rank vegetation.

31. KUDA CAVES, KUDA, DISTRICT RAIGAD

The step leading to the caves were repaired.

32. RAIGAD FORT, RAIGAD, DISTRICT RAIGAD

The uneven and sunken flooring of the Bale Qilla was removed and laid cement-concrete flooring with proper level and slope as per original. The parapet wall was repaired with coursed rubble masonry. The mild steel gate with iron frame was also provided.

33. SINDHUDURG FORT, SINDHUDURG, DISTRICT SINDHUDURG

Deep-rooted vegetation was removed from outer and inner walls of the fort. In addition to the work of underpinning carried out to the fort wall, a new pathway was constructed by laying rubble stones and plastering on the top.

34. VIJAYDURG FORT, DISTRICT SINDHUDURG

The work of removing rank vegetation and debris clearance from the moat, Bhuyar. Khalbatkhana, and Barud Khana was carried out. The damaged and sunken flooring of the horse stable was restored. Deep rooted vegetation was cleared from inner and outer sides of the fort wall.

35. KANHERI CAVES. KANHERI, DISTRICT THANK

Pathway was laid in cement-concrete from foothill to Cave 4. The dead plaster was replaced by new cement-plaster inside the booking office. The staff quarters were provided with new doors, windows etc., wherever necessary.

36. SIVA TEMPLE, AMBARNATHA, DISTRICT THANK

From main temple to the nearby stream a new drainage system was provided. Repairs were carried out to the steps of north side entrance of the compound wall. The oil paint was applied to the barbed-wire fencing and to the doors of temple.

BANGALORE CIRCLE

KARNATAKA

37. FORT, DINGEON AND GATEWAY, BANGALORE, DISTRICT BANGALORE

The northern wing of the fort wall was watertightened after laying a pavement of stone slabs. The joints were pointed and lime-concrete in brick jelly was provided over it by giving necessary gradient for draining out rain-water. Stone pavement at the entrance was also provided to the fort and new steps wherever missing were provided as per the original layout. M.S. grill was provided to a considerable height over the existing dwarf wall and M.S. gate fixed at the main entrance to avoid public trespassing. The earthen ramp provided to the terrace of the fort was removed and stone steps were provided to match the structure. The facade of the main entrance, the north gate and the cells, were suitably painted to match the original colour.

38.ACIIYITARAYATEMPI E, VENKATAPURA, DISTRICT BELLARY

The fallen and sunken *adhishthana* portion of the *utsava-mandapa* at the northeastern side of the temple-complex was dismantled and reconstructed to plumb as per original.

39. CHANDRASEKHARA TEMPLE, KAMALAPURA, DISTRICT BELLARY

Fresh granite slab veneering was provided to the southwestern portion of the enclosure wall and the core is filled with lime-mortar, mixed with brick-bats.

40. GROUP OF TEMPLES, HEMAKUTA HILLS, HAMPI, DISTRICT BELLARY

The out-of-plumb double-storeyed *mandapa* on the hill was dismantled and reconstructed to plumb as per original after replacing the broken roof-slabs, beams and pillars. The roof was watertightened. The buried plinth of the *mandapa* was exposed by removing the accumulated debris.

A disturbed and out-of-plumb small shrine of the north-east of Moola Virupaksha Temple was dismantled and reconstructed as per the original.

41. KALLE.NHVARV TEMPLE, AMBALI, DISTRICT BELLARY

An apron was provided all around the temple in granite stone and the joints were pointed in cement-mortar. The ugly looking chariot shed was shifted to a new place. Newly acquired area around the temple was levelled and fencing in crimped mesh was provided with L-shaped angle frames to the protected area.

42. KRISHNA TEMPLE. KRISHNAPURAM, DISTRICT BELLARY

The dilapidated and damaged stucco figures on the western and southern faces of the *mahadvara gopura* was mended as per original after reconstruction of the brick structure for core in original bricks and lime-mortar.

43. VISHNU (VARAHA TEMPLE), VENKATAPURA DISTRICT BELLARY

The accumulated debris in the courtyard was carefully removed and the buried plinth of the temple and the cloister *mandapa,* the entrance steps and the pavement of the courtyard were exposed. The fallen architectural members of the temple were photo documented and stacked for reuse.

44. VITTHALA TEMPLE, VENKATAPURA, DISTRICT BELLARY'

The fallen and out-of-plumb portion of the northern cloister *mandapa* was dismantled and re-erected after laying a strong foundation in combination mortar. The sunken *prakara* wall on the northern side was dismantled and reconstructed as per original after providing a foundation in cement-concrete.

45. AMRUTESVARA TEMPLE, AMRUTAPURA, DISTRICT CHIKMAGALUR

The damaged capitals of the *navaranga* were replaced with new ones after dismantling the roof which was re-laid as per original. The fallen *chhajja* members were replaced and watertightened in lime-mortar. Stone pavement over a sandbed was provided around the *garbhagriha* after suitable earthwork.

46. FORT AND TEMPLES, CHITRADURGA. DISTRICT CHITRADURGA

Flight of steps were provided from treasury to Onake Obavva Kindi and pitching was provided on either side of the steps and the joints were pointed in 1:4 cement-mortar. The fallen portions of the fortification wall of the fourth and fifth entrance were restored as per original by utilizing the available members. A retaining wall was constructed in size stone masonry near the seventh entrance gateway.

47. HILL FORT AND RUINED PALACE, UCCHANGIDURGA, DISTRICT DAVANAGERE

The fallen portions of the fort wall enclosing the king's palace was restored as per original in size stone masonry, the roof was watertightened with lime-concrete in river pebbles and the top surface plastered in combination mortar.

48. MUSAFIRKHANA AND HONDA, SANTHEBENNUR, DISTRICT DAVANAGERE,

The whole roof of the Musafirkhana and miniature shrines were watertightened by providing *surkhi* and plastering the surface with combination mortar mixed with waterproof compound. A broken beam of the *mandapa* at the northwestern corner of the Honda was strengthened by inserting T section girder and mending by suing epoxy resin.

49. SCULPTURE SHED, BAGALI, DISTRICT DAVANAGERE

A grill in crimped mesh was fixed over a dwarf compound wall in front of the sculpture shed.

50. CHENNAKESHAVA TEMPLE, ARAKERE, DISTRICT HASSAN

The newly acquired area around the temple is fenced in crimped wire mesh over a dwarf wall. A retaining wall was constructed in size stone on the northern side of the temple to prevent erosion of land.

51. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN

The damaged portion of the compound wall on the northern side was restored as per original and plastered. A new pathway was laid directly from Hoysalesvara Temple to Huchesvara Temple for the movement of tourists. Curb stones were fixed on either side of the pathway.

52. KESHAVA TEMPLE, BELUR, DISTRICT HASSAN

The decayed lime-plaster and the damaged flat tiles of the leaky-roof of the temple were removed and the roof was replastered in lime-mortar after replacing the damaged flat tiles. The height of the parapet was reduced suitably and the surface was replastered. The lichen, moss and the bird's excreta over the entrance *gopura* was removed and a suitable colour was applied on the surface.

53. NAGESVARA AND CHENNAKESHAVA TEMPLE, MOSALA. DISTRICT HASSAN

The archaeological area was fenced in crimped mesh over a dwarf wall in size stone masonry.

54. FORT AND LARGE MASONRY ELEPHANTS, MEDIKERE, DISTRICT KODAGU

On the northern side, the missing portion of the brick parapet wall is restored as per original and the remaining portion was strengthened by lime-plastering. The top portion was watertightened by applying a coat of lime-plaster mixed with waterproof compound.

55. BHOGANANDISVARA TEMPLE, NANDI, DISTRICT KOLAR

The unauthorized occupants of the *mandapas* outside the temple were evicted and the debris removed. The undulating area was levelled to keep the premises presentable. The sunken and disturbed cloister *mandapas* were dismantled and reconstructed as per the original plan. The roof was watertightened by providing a fresh weatherproof course in combination mortar. The archaeological area on the southern side was fenced in barbed-wire set in iron angles.

56. TIPU'S LODGE, NANDI, DISTRICT KOLAR

The leaky-roof of the main hall was watertightened by applying 1:1:3: combination mortar. Stone pitching was provided to the pathway and joints were pointed. Stone pavement was provided all around the structure. The wooden members were applied with suitable paint to match with the original after scraping the decayed painted surface.

57. COLONEL BAILEY'S DUNGEON, SRIRANGAPATNA, DISTRICT MANDYA

The undulated ground around the Dungeon and the entrance were levelled. The brick masonry parapet on the eastern, western and the northern sides of the Dungeon was watertightened by plastering the top with lime-mortar mixed with waterproof compound. The leaky-roof of the Dungeon was plastered in combination mortar mixed with waterproof compound. Disturbed approach steps constructed in rubble masonry were completely removed and fresh steps in granite stone was provided as per the original height over a cement-concrete base. M.S. railing was fixed for approach to the flight of steps. Stone revetment was provided on either side of the entrance to the Dungeon. M.S. grills were provided at the openings of the bastions and the missing portion of the retaining wall on the western side was reconstructed with the available suitable stones.

58. OBELISK, SRIRANGAPATNA, DISTRICT MANDYA

Stone retaining wall was constructed on the eastern side besides plastering the parapet in lime-mortar. The stone joints around the obelisk was pointed in cement-mortar. The letters engraved on the pillar were retouched with suitable paint.

59. SPOT WHERE TIPU'S BODY WAS FOUND, SRIRANGAPATNA, DISTRICT MANDYA

Flooring in two-line dressed granite slab was provided around the stone tablet and curb stones were erected at the edges. A stone dwarf wall was constructed on the western side with M.S. railing erected over it in addition to M.S. gate provided at the center. To avoid encroachment and trespassing compound was raised by using two-lined dressed-granite slabs for veneering the brick masonry wall, on the northern and eastern sides.

60. SRI RANGANATHASVAMY TEMPLE, SRIRANGAPATNA, DISTRICT MANDYA

The broken beam of the inner entrance was strengthened by inserting M.S.I, beam and mending by using epoxy resin and also by removing the ugly looking column support. The stepped-pond noticed in the complex during earthwork while levelling the area was cleaned and reconditioned. The drain provided to the main shrine was reconditioned. The wooden doors of the sub-shrines were repaired and strengthened by providing new scantlings and replacing the hinges. The wooden doors, windows and iron grills were coated with enamel paint after scraping the old paint.

61. THOMAS INMAN DUNGEON, SRIRANGAPATNA, DISTRICT MANDYA

Brick parapet wall wherever missing was reconstructed as per the original. The brick wall wherever weak was strengthened by underpinning with size stone in cement-mortar. Revetment wall was constructed around the Dungeon to avoid erosion of earth. Suitable steps were provided at the entrance after levelling the area around.

62. KIRTINARAYANA TEMPLE, TALAKAD, DISTRICT MYSORE

Reconstruction of the dismantled *mahadvara* was in progress. To strengthen the foundation rubble masonry was provided over a sand-cement bed after suitable earthwork. Resetting the *adhishthana* members as per the original plan was taken-up.

63. LAKSHMIKANTA TEMPLE, MULLUR, DISTRICT MYSORE

The dislodged and out-of-plumb *mukha-mandapa* and the *navaranga* of the temple were completely dismantled after thorough documentation. The foundation was strengthened by laying cement-concrete bed after suitable earthwork. Resetting the original members over a rubble stone masonry is in progress.

64. SRIKANTESVARA TEMPLE, NANJANGUD, DISTRICT MYSORE

The cracked stone beams and lintels on the northern side of the temple was strengthened by inserting stainless steel clamps. Mending and strengthening the stucco figures of the chikka *gopura* as per original in finely-grained lime mixture is in progress.

65. AGHORESVARA TEMPLE, IKKERI, DISTRICT SHIMOGA

A plinth protection course in stone slab was provided around the *devi* shrine.

66. GROUP OF MONUMENTS, BANDALIKE, DISTRICT SHIMOGA

Barbed-wire fencing with L angles over a dwarf wall was provided on the eastern side of the protected area.

67. KEDARESVARA TEMPLE, BELLIGAVI, DISTRICT SHIMOGA

A retaining wall was constructed in rubble size stone with cement-mortar on the northern side of the protected area.

68. CHANNIGARAYA TEMPLE, ARALAGUPPE, DISTRICT TUMKUR

After removing the dead lime-plaster, the leaky-roof was watertightened by laying a fresh course of lime-concrete in brick jelly mixed with waterproof compound and plastering surface.

69. KEDARESAVARA TEMPLE, NAGALAPURA, DISTRICT TUMKUR

The missing veneering of the outer walls of the temple was provided with schist stone to match with the original and the core was filled with rubbles. The wall sculptures were replaced in conformity with the original.

BHOPAL CIRCLE

MADHYA PRADESH

70. BARADARI, ATER FORT, ATER, DISTRICT BHIND)

Scientific clearance of settled debri and sorting out the architectural fragments of ancient bricks to be kept at suitable place for reuse and throwing waste material away from site is in progress.

71. KAMALAPATI PALACE, BHOPAL, DISTRICT BHOPAL

Watertightening of roof-terrace and replacement of damaged door with new ones were done. Provided stone slab flooring in front portion of the palace on the base of cement-concrete. Barbed-wire fencing in angle iron posts in cement-concrete block including entrance gate to avoid encroachment and entry of animals and unsocial elements were taken up.

72. CHITRAGUPTA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

Relaying of stone slab flooring over the platform on the base of concrete towards northern side of the temple, matching the original was completed.

73. LAKSHMANA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR

The work of resetting of sub-shrine above *jagati* platform with original ashlar masonry work of pillars, door-jamb, veneering stones with lime-,*surkhi* and sand-mortar and providing copper clamps on each stone in each layer of the documented stones of shrine is in progress.

74. DEVAGARH FORT, DISTRICT CHHINDWARA

Scientific excavation and clearance of debri and collection of serviceable stones at the site for reuse was done besides removal of grass, vegetation, bushes and uprooting shrubs from high walls of the fort.

75. SIVA TEMPLE, NOHTA, DISTRICT DAMOH

Surface dressing and levelling the area around the platform, dismantling for the bulged and broken flag-stone flooring and collection of useful stones at the site for reuse and removal of waste material from the site, besides making provisions for flood light were attended to on four sides of the Siva Temple.

76. BEER SINGH PALACE, DATIA, DISTRICT DATIA

The work of laying lime-concrete in brick ballast in Hme-5MrM/-mortar and finished top surface with the treatment of *gur* and belgiri solution was taken up at the palace.

77. ROCK-CIT CAVES, BACH, DISTRICT DHAR

In continuation of the last year's work *(1998-99,* p. 276), construction of R.C.C. pillar and false ceiling besides providing support to the roof in Caves 2 and 7 matching the original was done. In addition, scientific removal of fallen debris and rubbles around the Caves 2 and 3 and laying of lime-concrete flooring in Cave 7 were completed. Clearance of vegetation around the facade was also taken up besides providing and fixing Kota stone-slab flooring in the painting shed at Bagh.

78. GADHA SHAH PALACE, MANDU, DISTRICT DHAR

Laying of concrete for watertightening the excavated pits including the finishing of top is in progress.

79. SAT KOTHARI CAVES, MANDU, DISTRICT DHAR

Restoration of Baoli walls with original stone masonry including dressing and laying of stone very carefully and dismantling the buldged portion by erection of scaffolding, were taken up. The work is in progress.

80. JAMA MASJID, CHANDERI, DISTRICT GUNA

Conservation work with ancient ashlar stones masonry in *lime-surkhi-mortar* and sand-mortar on the rear side of the mosque including removal of buldged walls was attended to besides providing stone *kanguras* on the parapet wall of the mosque.

81. KOSHAK MAHAL, CHANDERI, DISTRICT GUNA

Restoration of walls of the Mahal, with ashlar stone masonry in *lime-surkhi* and sand-mortar matching the original is in progress.

82. SINGHPUR PALACE, CHANDERI, DISTRICT GUNA

Restoration work of stone masonry with available stones in *lime-surkhi* and sand-mortar was attended to.

83. SCULPTURE SUED, THOBAN, DISTRICT GUNA

The work of providing and fixing stone slab (tiers) in brick masonry pillars for keeping loose sculptures inside the sculptureshed was taken up.

84. TOMB OF ABDUL FAZALS, ANTRI, DISTRICT GWALIOR

The work of providing dwarf wall in C.R. stone masonry in lime-mortar with its extension to avoid encroachment and covering the drains with stone slab was completed.

85. MAN SINGH PALACE, GWALIOR FORT, DISTRICT GWALIOR

Watertightening of roof of the palace with brick ballast was done in *lime-surkhi* mortar and the top finished. *Kakshasana* stones were also fixed.

86. TELI-KA-MANDIR, GWALIOR FORT, DISTRICT GWALIOR

Relaying of stone slab flooring over the base of lime-concrete on the platform around the temple was completed.

87. TOMB OF MOHAMAD GHAUS, GWALIOR, DISTRICT GWALIOR

Reconditioning of approach road leading to the tomb with stone slab flooring over lime, cement-concrete was completed besides M.S. grills over the compound wall for safety and security and a bore well for environmental development and maintenance of lawns, plantation were provided in addition to sodium vapour lamps around the complex.

88. EXCAVATED SITE, PAWAYA, DISTRICT GWALIOR

Resetting of platform with ancient brick tiles in open top surfaces in *lime-surkhi* mortar over bedding of lime-concrete and walls with ancient brick masonry in *lime-surkhi* mortar towards southern face was completed.

89. CHAUSATH YOGINI TEMPLE, BHERAGAT, DISTRICT, JABALPUR

Restoration of platform with ashlar stone masonry in *lime-surkhi* and sand-mortar with ancient available stones matching the original was completed. Stone flooring was provided on the top of the platform including filling of joints with *lime-surkhi* and sand-mortar. The southern opening with brick masonry in cement and sand-mortar was closed for safety and security. A dwarf wall was provided in stone masonry in lime-mortar and the top mounted with barbed-wire fencing in angle iron posts.

90. VISHNU VARAHA TEMPLE, KARITALAL, DISTRICT JABALPUR

The work of providing foundation and filling with cement-concrete in base and filling the foundation with R.R. stones in cement-mortar for construction of boundary wall around the temple to avoid entry of animals and unsocial elements is in progress.

91. SOMANATHA TEMPLE, BARGAON, DISTRICT KATNI

Scientific clearance of debris and sorting out architectural fragments and stacking at suitable place for restortion of *jagati* platform are in progress.

92. BEGAM MAHAL AND SPORTING PALACE (KNOWN AS DAL-BADAL MAHAL), RAMNAGAR, DISTRICT MANDLA

Restoration of missing portion of the walls with available stones in *lime-surkhi* and sand-mortar, plastering the same, matching the original besides scientific clearance of debris and sorting out architec-

tural fragments for reuse including removal of bushes from the place and restoration of courtyard in lime-*surkhi* mortar were undertaken.

93. BUDDHIST ROCK-CUT CAVES DHAMANAR, DISTRICT MANDSAUR

Watertightening of the roof-terrace by providing and laying lime-concrete on the terrace of the caves including ramming and smoothening with treatment of *gur* and Belgiri fruits etc., were taken up and completed. The work of providing welded square wire mesh shutters in the angle iron frames to prevent entry of birds and bats in the caves was completed.

94. YASHODHARMAN'S VICTORY PILLAR, SODHNI DISTRICT MANDSAUR

The work of providing dwarf wall in C.R. stone masonry in cement-mortar in place of barbed-wire fencing and approach path of cement-concrete leading to the monument besides resetting of stone slab flooring over the bed of concrete with available stone slabs around the platform of the pillar, was taken up.

95. EKATARSO MAHADEO TEMPLE, MITAOLI, DISTRICT MORENA

Providing cement-concrete in foundation and filling the foundation with stone masonry for construction of retaining wall to prevent erosion around the temple periphery is in progress.

96. GARHI, PADAWALI, DISTRICT MORENA

Restoration of Burj (Bastion) and walls of the Garhi in stone masonry in *lime-surkhi* and sand-mortar towards southern and eastern sides including removal of buldged portion matching the original were taken up and completed. Structures exposed by removal of debris from rear side of the Garhi were conserved and the area was levelled by providing apron. The work is in progress.

97. KAKANMATH TEMPLE, SIHAMA, DISTRICT MORENA

Dressing of stone blocks, carving and moulding for restoration of top two layers of '*jagati* platform are in progress.

Restoration of retaining wall behind *jagati* with R.R. stone masonry in *lime-surkhi* mortar and the work of providing stone slab flooring over base of cement-concrete are also in progress.

98. CHOMUKHANATHA AND PARVATI TEMPLE, NACHNA, DISTRICT PANNA

The work of providing stone masonry dwarf wall in lime-cement mortar, mounted with barbed-wire fencing in angle iron posts in place of barbed-wire fencing for safety and security was attended to.

99. ROCK-SHELTERS AND PAINTINGS, BHIMBETKA, DISTRICT RAISEN

Approach path of cobble and *murrum* soling and filling with cement-concrete, matching the original along with stone edging, on both sides of the approach was provided for easy movements of the visitors.

100. SAIVITE TEMPLE, BHOJPUR, DISTRICT RAISEN

The first phase of lifting and fixing huge blocks of sandstone after dressing, carving and moulding, matching the original, were skillfully transported to the top of the Siva Temple, with the help of cranes and chain pully blocks was successfully completed. Sequel to it, the stone blocks were shifted in place to complete the corbelled ceiling of the temple.

In the second phase huge blocks of sandstone, finally dressed, carved and moulded, matching the original size were skillfully lifted and fixed, including

erection of M.S. pipe scaffolding upto the height of 70 m.

Fencing of the notified area by erecting angle iron posts in hard rocky surfaces, by drilling with machine, fixing of main entrance gate with C.R. stone pillars after removing the encroachment around the temple were partly taken up and completed.

A tube-well was provided within the confines of the temple for drinking water.

101. STUPA, MURELKHURD, DISTRICT RAISEN

Conservation and part restoration of the stone Stupas 2 to 5 with dry stone masonry and originally available stones including removal of the buldged and out-of-plumb portion were completed.

102. BUDDHIST STUPAS, SANCHI, DISTRICT RAISEN

Restoration and water-tightening of top courses of the upper boundary wall with ancient stones in lime-*surkhi* and sand-mortar was completed. The work of filling up of excavated trench with sediments, the cavities in Stupa 1 and minor repairs were also completed.

Construction of boundary wall in C.R. stone masonry in cement-mortar on the base of cement-concrete, mounted with M.S. grill over the boundary wall, to avoid encroachment is in progress.

103. STUPA NO. 1, SATDHARA, DISTRICT RAISEN

Restoration of upper *pradakshina-patha* and *medhi* with C.R. stone masonry in lime-cement-*surkhi,* and sand-mortar matching the original and filling inner core with R.R. stone masonry with cement-*surkhi* and sand-mortar are in progress under UNESCO project.

Steps were provided to the upper *pradakshina-patha* with stone slabs besides consolidation of approach path with cobbles and *murrum* with stone, metal and murrum from Stupas 8 to 12 and Monastery 2.

The work of filling the excavated trenches with sediments and restoration of boundary around the stupa with original stones in *lime-surkhi* and sand-mortar in Stupa 2 was attended to.

Reconditioning of approach road with W.B.M. including providing cross drains at suitable intervals with the help of earthen pipes to stop erosion of earth and soil from the existing road from the canal to the site at Satdhara were completed.

104. BUDDHIST STUPAS, SONARI, DISTRICT RAISEN

For easy movement of the tourists, approach path in dry stone masonry was laid.

105. FORT, RAISEN, DISTRICT RAISIN

The work of restoration of fort walls with available stones in *lime-surkhi* and sand-mortar, matching the original and removal of the buldged and out-of-plumb portion was completed.

106. BUDDHIST STUPAS, DEOR KOTHAR, DISTRICT REWA

Providing stone masonry dwarf wall with ancient stones was provided for demarcation of the area in lime-mortar and filling up the foundation and levelling the surface area to avoid encroachment.

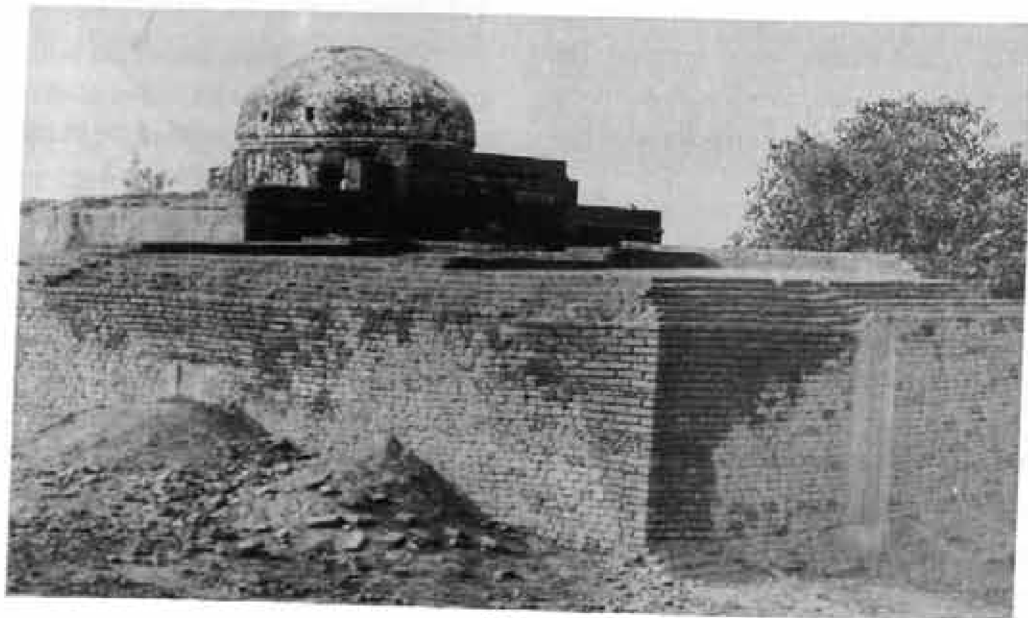
107. STUPAS, PANGURARIA DISTRICT SEHORE

Scientific clearance work and removal of debris around the stupas (five numbers) taking out the buldged and out-of-plumb masonry and collection of serviceable stones for reuse were done.

Plates 175-176



175



176

Hansi, Prithvi Raj Chauhan's Fort: 175, *before* and 176, *after repairs of gateway to the mosque*

Restoration of stupa and *pradakashina-patha,* with original stone including removal of out-of-plumb and buldged portion of stupa and resetting with lime-surkhi and sand were done.

108. HINDOLA TORON, GYARASPUR, DISTRICT VIDISHA

The treatment of approach path by providing stone slab flooring laid over cement-concrete base was completed.

109. UDAIGIRI CAVE, VIDISHA, DISTRICT VIDISHA

Approach path is being provided to the caves for the visitors.

BHUBANESWAR CIRCLE

ORISSA

110. PATALESVARA TEMPLE, MALHAR, DISTRICT BILASPUR

Uneven floor of the *garbhagriha* was repaired besides the restoration of *Siva-linga* to its original height.

111. BARABATI FORT, CUTTACK, DISTRICT CUTTACK

Restoration of citadel wall of the excavated pillared-hall with laterite stone blocks, pointing and watertightening the cracks and joints, flooring with available stone blocks in front of the citadel wall, etc. were attended to.

112. EXCAVATED BUDDHIST MONASTERY II, UDAYGIRI, DISTRICT JAJPUR

The work of core filling, watertightening and restoration of brick veneering wall, brick arch and the top surface was attended to.

113. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT KHURDA

The sub-shrine namely Ekamresvara Temple in the lord Lingaraja Temple-complex was grouted and pointed.

114. LORD JAGANNATHA TEMPLE, PI RI, DISTRICT PIRI

In Kothaghar Rosaghar, after deplastering the dead lime-plaster, the work of deplastering and white washing was attended to.

Watertightening the roof of *mukti-mandapa* and *jhulana-mandapa* is in progress.

After deplastering the dead lime-plaster of the *nata-mandapa* replastering of the inner roof was attended to.

In *bhoga-mandapa* replastering, white washing and fixing of new wire mesh were done after removing the damaged and dead lime-plaster.

Removing the damaged and dilapidated tiled *roof of khajaghar* and reconstruction with new tiles with cement-concrete and wire mesh were taken up.

115. Si N TEMPLE, KONARAK, DISTRICT PI HI

Widening of pathway around *nata-mandapa* was completed besides restoring and renewing of sub-shrines located on the northern sides of the Sun Temple and laying of roads to the main temple is in progress.

CHANDIGARH CIRCLE

HARYANA

116. ANCIENT SITE, BANAWALI, DISTRICT FATEHBAD

Necessary repairs to the crumbling shed, con-

Plates 177-178



177



178

Hansi, Prithvi Raj Chauhan's Fort: 177, *before* and 178, *after repairs of gateway to the mosque*

Plates 179-180



179



180

Karnal, European soldier's graves: 179, *before* and 180, *after conservation*

Plates 181-182



181



182

Karnal, Kos Minar (Minar road): 181, *before* and 182, *during repairs*

Leaky-mud roof was taken out. Wall tops were strengthened to bear the load of M.S. channel sections. CGI. sheet roof was provided over the M.S. sections. Replastering was done on the walls with mud.

117. PRITHVIRAJ CHAUHAN'S FORT, HANSI, DISTRICT HISSAR

The remaining work of repairs to the gateway of the mosque was completed (pis. 175-178). The work of fencing the protected area and partly on the northern and eastern sides was taken up.

118. FEROZSHAH PALACE, HISSAR, DISTRICT HISSAR

The repairs to the ruined palace and its cells were taken up for the first time in the north-west side of the complex. Heaps of bird's dropping inside the shells were removed. Debris/rubbish accumulations on the western side were removed. Patch repairs to the stone masonry were attended to. Wide and deep joints of the stone masonry of the cells were filled up and the surface finished with pointing. Lime-concrete flooring was done in the passage, rooms and cells besides attending to the patch plastering. Barbed-wire fencing was provided to the market sides and the area in-between fort wall and fencing was cleaned and levelled. For developing a garden in the front side, the area was filled up with earth.

119. Kos MINAR, DAHA, DISTRICT KARNAI.

The brick masonry boundary wall, covered by the earth deposits due to raising of adjoining highway level, was raised with brick masonry after removing the existing grill, which was fixed at a higher level. Plastering in lime-mortar was done to the restored masonry surface. A traffic guide wall on the road side and protection notice boards were also provided.

120. GHARAUNDA SARAI, GHARAUNDA, DISTRICT KARNAL

On the rear gate of the sarai. missing brickwork of the boundary wall, near gate was attended to. In addition to two M. S. gates and hand pump was also installed. Undulated areas along the boundary wall were levelled and dressed and flower beds were laid.

121. KOSMINAR, GHARAUNDA (SOUTH), DISTRICT KARNAL.

M.S. Grill fencing was provided to around the minar.

122. EUROPEAN SOILDER'S GRAVES, KARNAL, DISTRICT KAKNAL.

The vegetational growth from the graves was removed including uprooting of tree roots. Damaged/ broken masonry was reset. Patch plastering work was attended to. Brick-on-edge pathway for the part length over a layer of base concrete was provided (pls. 179-180).

123. KOSMINAR, KARNAI. (MINAR ROAD), DISTRICT KARNAL.

Missing patches of masonry in the minar were restored and repairs to the Minar in patches by plastering were done (pls. 181 -182). Growth of trees from the top was removed. M.S. Gill was provided to the Minar over a dwarf wall of brick masonry. Protection Notice Board was also fixed at the monuments.

124. KOSMINAR, KARNAI DISTRICT C'HOWK KARNAI.

M.S. Gill and plastering around the Kos Minar. over a brick masonry and the dwarf wall were done besides providing a Notice Board.

Plates 183-184



183



184

Meham, Shah Jahan-ki-Baoli: 183, *before* and 184, *during reconstruction of side walls*

125. RAJA HARSH-KA-TILA, THANESAR, DISTRICT KURUKSHETRA

The protected area was fenced with barbed-wire as per availability of the funds.

126. KOSMINAR, ZAINPURA, DISTRICT KURUKSHETRA

The work of removing profuse growth of vegetation and trees around the minar besides attending to the missing brickwork near the base and patch plastering were taken up and completed. In addition to the M.S. Grill over the brick masonry dwarf wall. Protection Notice Board was also provided.

127. IBRAHIM'S TOMB, NARNAUL, DISTRICT MAHENDERGARH

Flag-stone flooring was attended to near the steps leading to the tomb. Missing/broken flooring stones in the courtyard of the tomb were replaced. Repairs to the room adjacent to steps were attended to. Steel gates were provided to check unauthorized entry to the upper storey of the tomb.

128. JAI. MAHAL, NARNAUL, DISTRICT MAHENDERGARH

The lime-concrete flooring of the Jal-Mahal was reconcreted after carefully removing the damaged ones. The walls were replastered after removing flaking patches. Concrete was laid over the *chhajjas.* Missing stone slabs were replaced. Steel gates were provided to check the entry to the upper storeys of Jalmahal. Action is being taken for overall development of the monument.

129. PATIAL A TEMPLE MANSA DEVI, DISTRICT PANCHKULA

Repairs to Patiala Temple of Mansa Devi were done uner the deposit works. The scaffolding was erected around the tower of the temple to uproot the tree roots from the facade of the temple and the holes were grouted. Repairs resetting of some of the miniature shrines were attended to and the work is in progress.

130. KABULI BAGH MOSQUE, PANIPAT, DISTRICT PAMPAT

Repairs to the damaged and missing brick masonry in the back wall of the mosque were attended to besides repairs to fencing by providing missing angles and barbed-wire and steel gate at the entry to the monument.

131. SHAH JAHAN-KI-BAOLI, MEHAM, DISTRICT ROHTAK

Repairs to the hanging portions of the right side wall of the *baoli* was initiated. The trenches for foundation of the wall were excavated and removed the surplus deposit of earth. A steel gate was provided to the *baoli* and barbed-wire fencing was repaired by placing the missing angles and wires (pis. 183-184). The work is still in progress.

HIMACHAL PRADESH

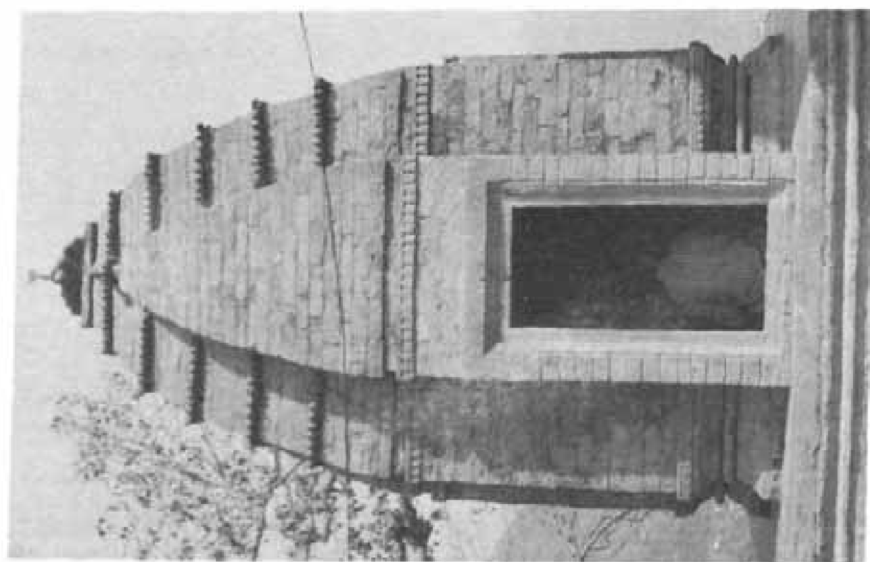
132. LAKHANA DEVI AND GANESA TEMPLES, BHARMOUR, DISTRICT CHAMBA

The decayed and damaged wooden members of the roof and temple were replaced with the new ones. Wooden railing of the Lakhana Temple was restored. Missing/broken slates of the roofs were replaced and necessary masonry repairs were attended to.

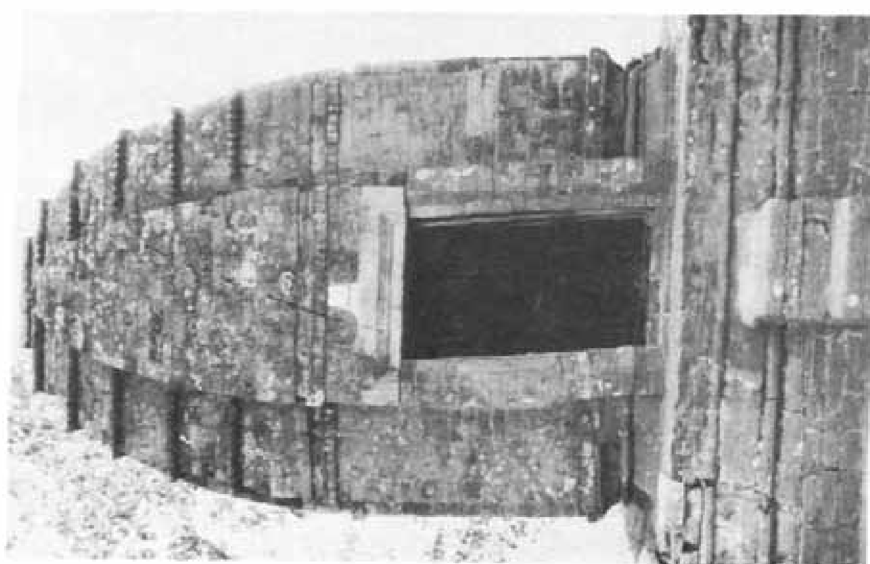
133. HARI RAI TEMPLE, CHAMBA, DISTRICT CHAMBA

The remaining work of repairs to the damaged flooring of the temple was attended to.

Plates 185-186



186



185

Chamba, Chamunda Devi Temple-complex: 185, *before* and 186, *after repairs to Siva temple*

Plates 187-188



187



188

Nurpur, Fort: 187, *before* and 188, *after patch repairs to mosque*

134. CHAMUNDA DEVI TEMPLE, CHAMBA, DISTRICT CHAMBA

The decayed planks of the temple ceiling, missing/broken slates of the roof were replaced with new ones. The wooden railing to the *parikrama* of the temple was repaired and restored. After proper documentation, cracked and tilted small sub-shrine in Chamunda Devi Temple compound dedicated to Lord Siva, was restored and reset as per original design and architecture (pls. 185-186). Collapsible gate was also provided to the sanctum of the Chamunda Devi Temple for the security of sculptures.

135.SHAKTI DEVI TEMPLE, CHATRARI, DISTRICT CHAMBA

Repairs to the Chatrari Temple were initiated by removing the accumulations from the intermediate floor. The decayed wooden planks were replaced besides applying a wood preservative. Mud-plaster was also restored over a sheet of polythene. Missing/broken slates of the roof were replaced and repairs to the back wall of the temple were attended to. The work is in progress.

136. NARBADESVARA TEMPLE, SUJANPUR, DISTRICT HAMIRPUR

The temple area was illuminated by pursuing the local administration, through the electrical department of the H.P. State Government at the cost of State Government.

137. BHIM-KA-TILA, CHAITRU, DISTRICT KANGRA

The barbed-wire fencing work, with M.S. angles, to the protected area was taken up and the work is in progress.

138. BAIJNATH TEMPLE, BAIJNATH, DISTRICT KANGRA

The original *kalasa* of the temple, which was abandoned and replaced by a new one, was repaired and reinstalled by bringing back the original glory and antiquarian importance. The park lights which were non-functional were repaired and made functional for illuminating the area. The temporary shops built adjacent to the protection limits of the temple on the main entry were removed with the help of the local administration. In the nearby temple of Sidhnath, wire net was provided and other minor repairs were attended to.

139. KOTLA FORT, KOTLA, DISTRICT KANGRA

Repairs to the Kotla Fort ruins situated on the hill top, were taken up by removing the vegetational growth from the structures and stabilizing the masonry walls by restoring the weak structural portions, pointing the joints and watertightening the wall tops. Entry to the fort was improved by providing steps and lime-concreting the flooring. Edging the old plaster was done and patch repairs of plaster were attended to. In the adjacent temple of Chamunda Devi, the work of restoring boundary/retaining wall, paving of the floor with stone was undertaken.

140. NURPUR FORT, NURPUR, DISTRICT KANGRA

Debris and vegetational growth from the Ranimahal area were removed and necessary repaires to brick/stone masonry were attended to by stitching of cracks, restoration of missing/hanging portions, pointing of joints, plastering etc. and laying lime-concrete on floors. Loose/missing masonry of the arches were reset. The open well was provided with a grill cover. The hanging masonry of the mosque was strengthened by attending to the missing masonry work (pls. 187-188).

141. HIIDIMBA DEVI TEMPLE, MANALI DISTRICT KULLU

The decayed and damaged wooden members

of the temple were replaced with new ones. Loose stone masonry of the walls were reset besides levelling and dressing of ground on the back side of the temple and providing proper stone pathway on the rear side. Settled and sunken flooring on the front and back side of the temple were reset.

Facilities for drinking water at the temple, were improved by providing water tank. The M.S. Grill and collapsible gate at entry to the temple has been provided.

142. TABO MONASTERY, TABO, DISTRICT LAHAUL AND SPITI

The work of providing wooden flooring in the *Dukhang* was taken up. Plank flooring was provided to over a frame work of timber members embedded in base concrete. Necessary props were provided to the statue of the Buddha. Repairs in mud-plaster were attended to. The work is in progress.

143. MIRKULA DEVI TEMPLE, UDAIPIR, DISTRICT LAHAUL. AND SPTTI

The Government of Himachal Pradesh provided wood for repairs of roof of the temple, free of cost, which were transported to the site for repair work which will be completed in the next financial year.

144.TEMPLE OF GAURI SHANKARA, DASSAL, DISTRICT KULLU

The foundation of the temple was strenghthened by removing loose masonry bit-by-bit, resetting and grouting. The front and rear side flooring was also attended to. A stone masonry boundary retaining wall was constructed. The temple was illuminated with lights.

145.TRILOKI-NATH TEMPLE, DISTRICT MANDI

The loose masonry around the *baoli* was reset and a stone pathway was provided to the monument. The foundation of retaining wall in front of the temple was strengthened by inserting the masonry below ground level. The work is in progress.

146. RASHTRAPATI NIVAS, SHIMLA, DISTRICT SHIMLA

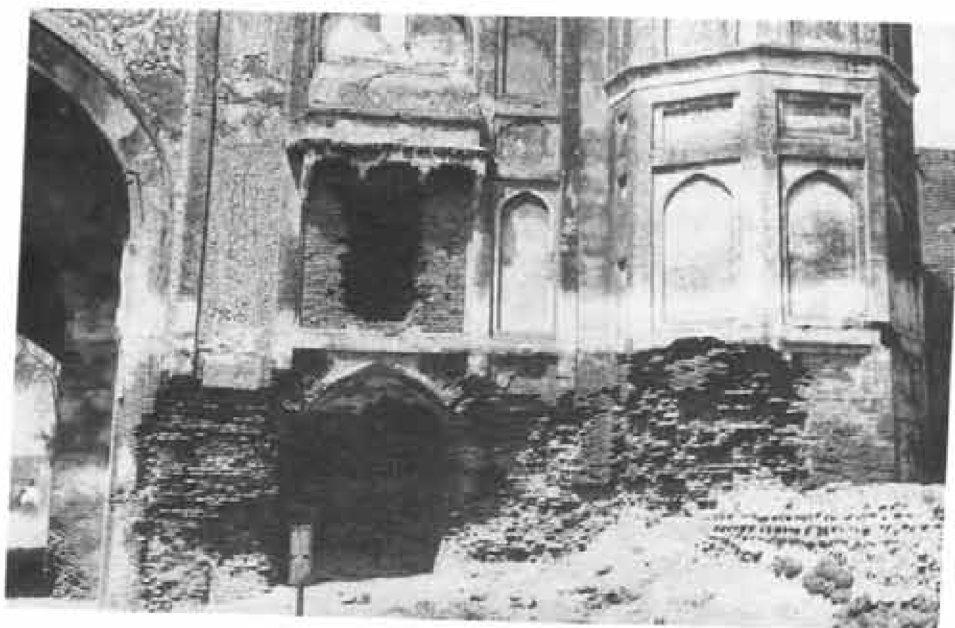
The repair work at the Council Chamber. Public Entry Building and Kitchen Wing was attended to. In the Council Chamber, the decayed and cracked concrete of leaky roof was filled in. A layer each of concrete and tarfelt was laid by bringing the surface to proper slope over a thick coat of bitumen. Over this tarfelt, a layer of concrete was provided as a cover and the top surface finished with a thin layer of sandstone slabs matching the surroundings. The gutter was constructed in proper slope. The stone masonry repairs in patches were attended to.

In the public entry building, the rooftop concrete was scraped, the cracks were filled, a layer of concrete was laid in proper slope besides providing tarfelt over a thick coat of bitumen. Similar treatment was given to the verandah roof in front side of the main building. The down water pipe were made functional and grills were provided at the inlets.

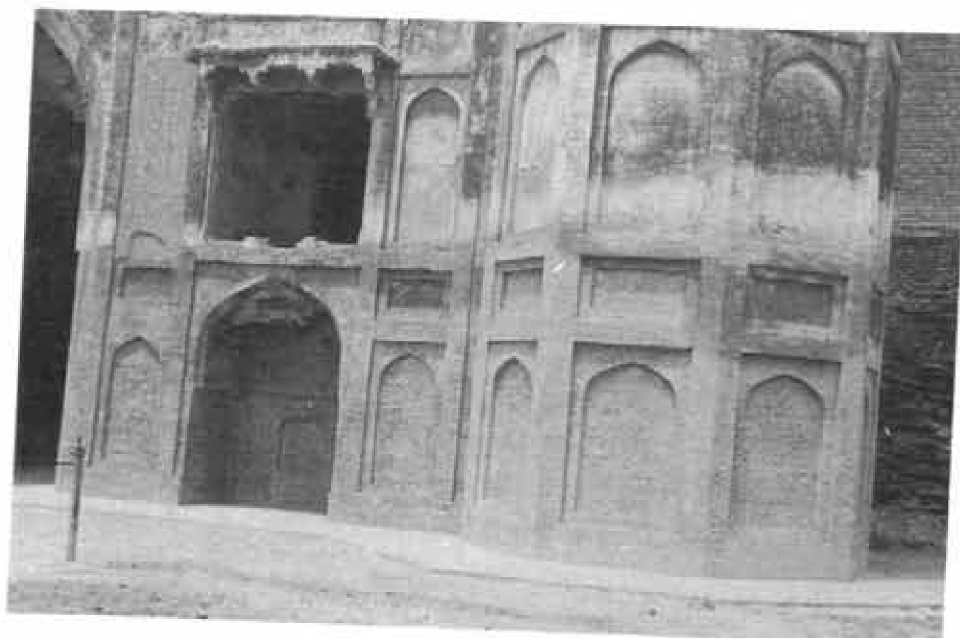
147. SIVA TEMPLE, MANGARH, DISTRICT SIRMOUR

Repairs to the woodwork of sub-shrines were attended to besides the roofs to check leakage. I Tie deposited earth surrounding the Siva Temple was removed and plinth protection was provided and stone masonry retaining wall on the *nala* side was provided to check the erosional damage to the temple.

Plates 189-190



189



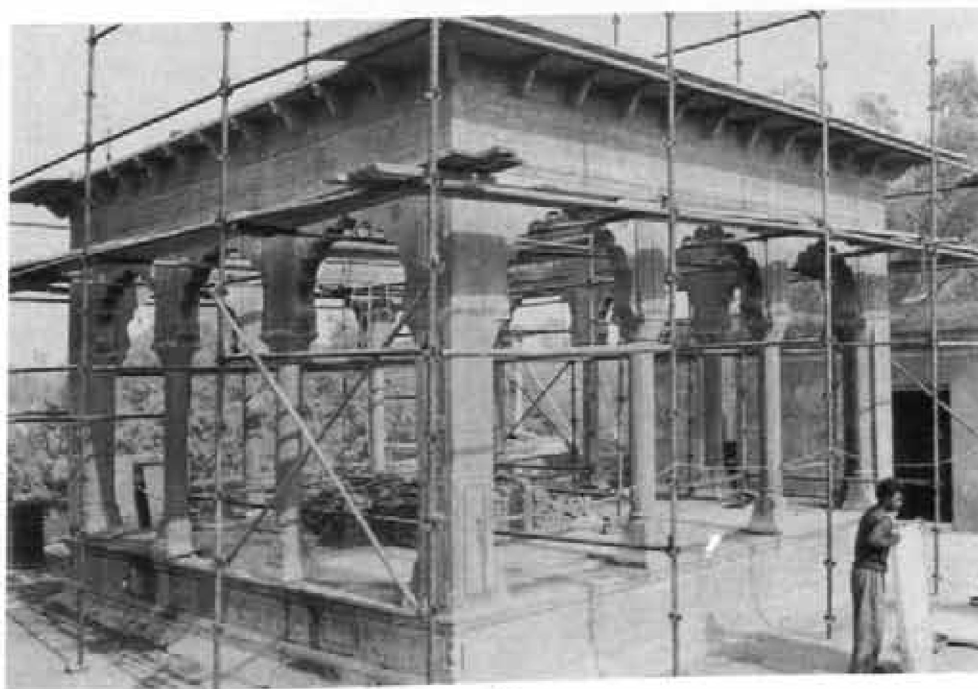
190

Amanat Khan, Sarai Amanat Khan: 189, *before* and 190, *after repairs to the eastern gateway*

Plates 191-192



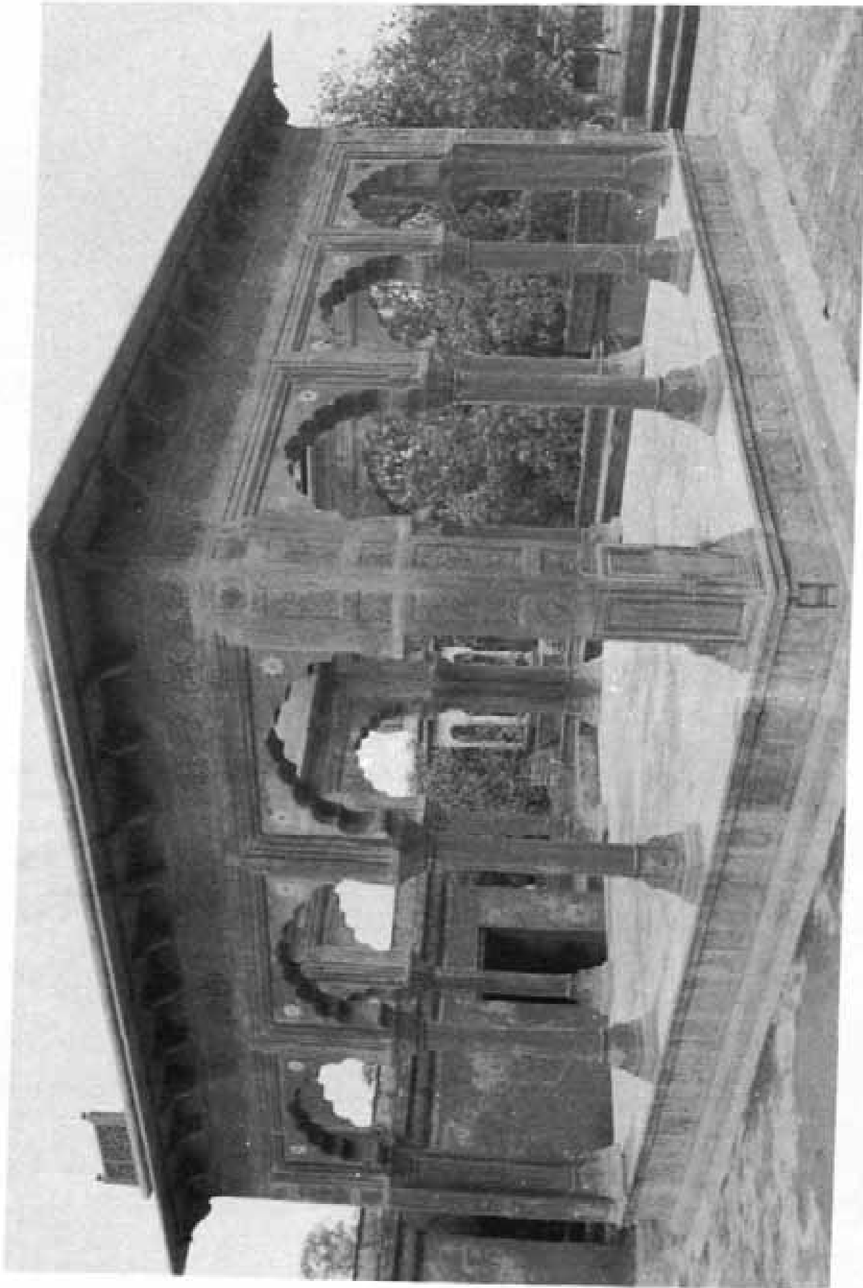
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192

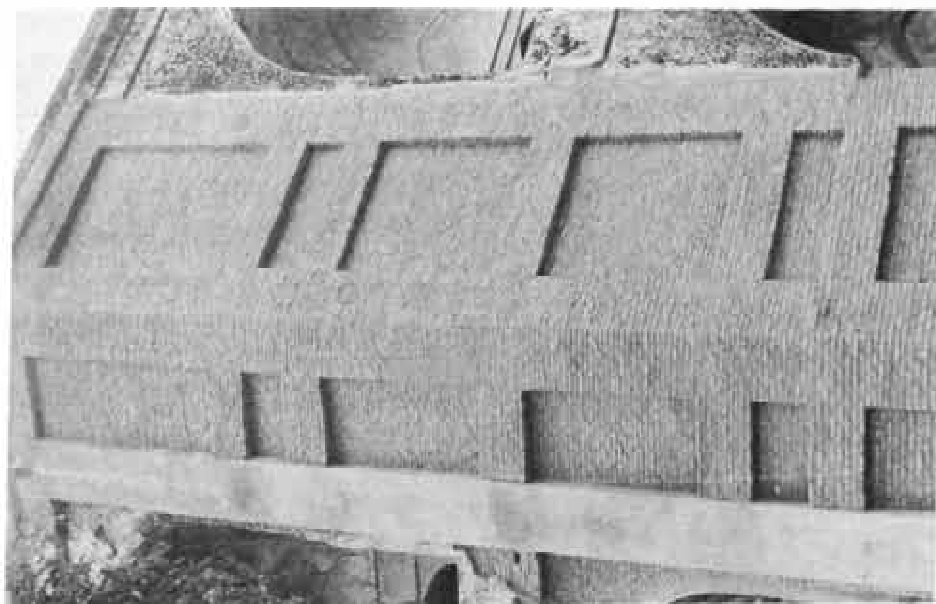
Amritsar, Deorhi Rambagh Gate: during repairs of the baradari

Plate 193

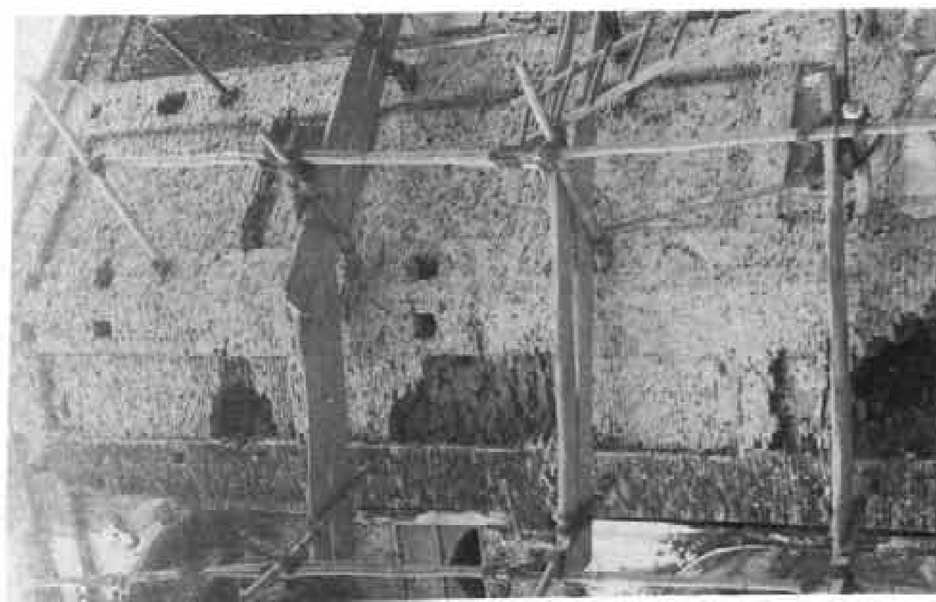


Amritsar, Deorhi Rambagh gate : after repairs to the baradari

Plates 194-195



195



194

Batala, Shamsher Khan's Tomb: 194, *during* and 195, *after repairs to the outer walls*

PUNJAB

148. GATEWAY OF MUGHAL SARAI, AMANAT KHAN, DISTRICT AMRITSAR

The repairs to the eastern gateway of the Sarai at the right side wing were attended to. Missing portions of the hanging masonry gate walls were restored after taking out the loose and decayed masonry, with *lakhauri* bricks and tiles. The accumulated debris were removed, brick paving was done in the guard rooms, plinth protection was provided and brick paving in the passage was done. The masonry joints were pointed and finished (pls. 189-190). The roof of the gateway was made watertight after removing vegetational growth, besides resetting of loose bricks and pointing the surface joints.

149. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR

In continuation of the previous *(1998-99,* p. 284) year's work, the restoration of red sandstone *chhajja* and *jalis* of the Baradari was undertaken. Two layers *of chhajja* stones were fixed after chiselling and carving as per original design and pattern. A decorative layer below the *jali* is being fixed. The preparation of *stone jali* is in progress. The fallen portion of the boundary wall was restored (pls. **191-** 194). The accumulated debris inside the complex was removed.

150. BHATINDA FORT, BHATINDA, DISTRICT BHATINDA

The work of repairs to inner fortification wall in the portion adjacent to Sub-Circle office was attended to by *lakhauri* bricks after filling the core. Water outlets were made functional. The top of the rampart was paved to make the surface watertight. In the Rani Mahal-complex the portion of the collapsed wall was restored to provide stability to the structure. The roof surface was provided with a layer of brick tiles over concrete base to avoid seepage of water. Barbed-wire fencing with M.S. angle posts was provided over the ramparts at fallen portions. The work of beautification and cleaning of area outside the fort walls was also attended to.

151. ANCIENT SITE AND STUPA, SANGHOL, DISTRICT FATEGARH SAHIB

The barbed-wire fencing work of the protected area of excavated site was taken up. From the stupa site, scientific clearance of accumulated deposits was done.

152. ANARKALI BARADARI, BATALA, DISTRICT GURDASPUR

The repair work to the Baradari was taken up. Missing wooden lintels have been provided over the door/window openings. S.W. pipes were provided to drain out the water besides R.C.C. pipes on the approach pathway connecting the Baradari. The work is in progress.

153. SHAMSHER KHAN'S TOMB, BATALA, DISTRICT GURDASPUR

In continuation of the previous *(J997-98,* p. 285) year's work, the repairs to the outer walls of the tomb were completed by taking out the loose and cracked portions and resetting the same as per original pattern (pls. 194-195). The work of providing plinth protection to the monument was attended to. Low lying areas were reclaimed by filling up with earth and levelling and dressing up of the area.

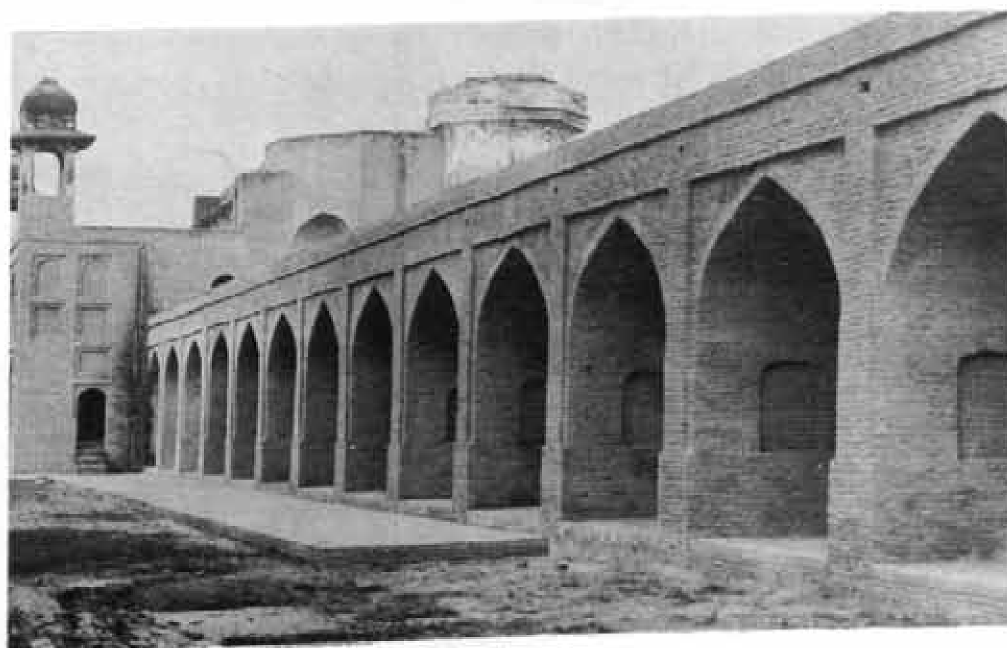
154. DAKHNI SARAI, DAKHNI, DISTRICT JALANDHAR

The restoration work of damaged cells was undertaken by attending to the repairs of missing

Plates 196-197



196



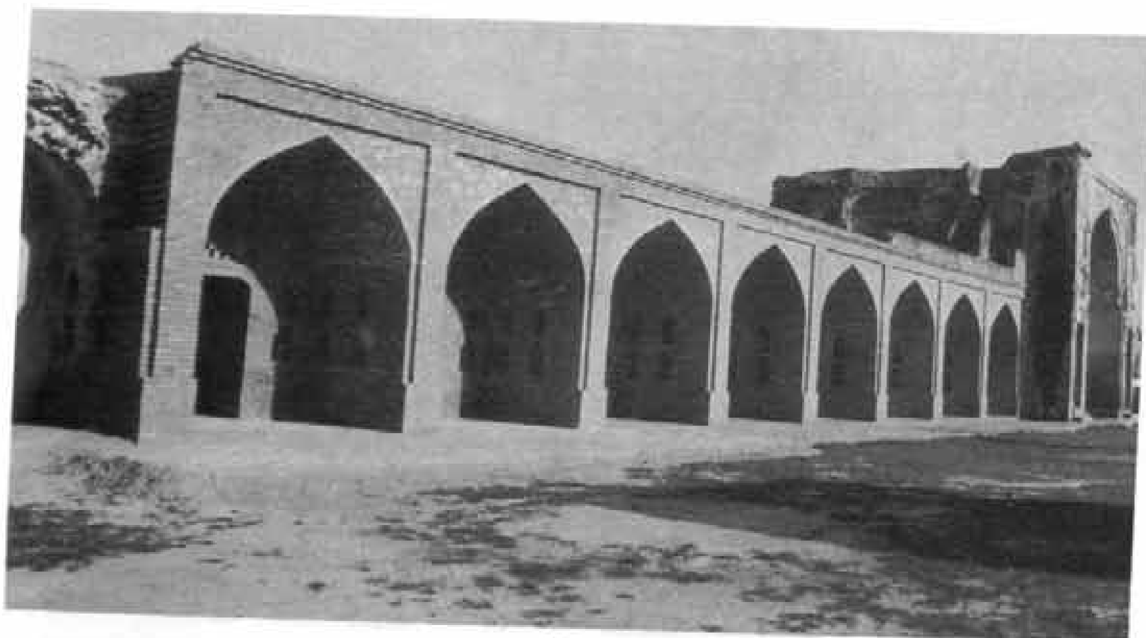
197

Dakhni Sarai: 196, *before* and 197, *after repairs to cells*

Plates 198-199



198



199

Nurmahal, Sarai: 198, *during* and 199, *after repairs to cells*

masonry portions, pointing the joints of inner and outer walls, vaults and arches, raking out the decayed concrete of sunken and disloged flooring and relaying of the same to make the surface watertight (pls. 196-197). The levelling and dressing up of the outer undulated area was done for developing a garden and the area.

155. TOMB OF HAJI JAMAL, NAKODAR, DISTRICT JALANDHAR

The decorative glazed tile work was stabilized by filling and providing edging to the missing portions. Replastering was done at the salt affected area of the plaster work. Pointing work was attended to the flooring joints and the grill doors were painted. The pulverized and flaking plaster of the dome was removed and replastering work was attended to in order to check leakage.

156. NOORMAHAL. SARAI, NOORMAHAL, DISTRICT JALANDHAR

The restoration work of the brick masonry cells on the back side of the Sarai was attended to by resetting the brick masonry arches as per original design, pointing the joints, brick paving of the floors and reconcreting of roofs (pls. 198-199). Heaps of debris and rubbish deposited along the Sarai wall were removed and disposed off. The area was developed by levelling and dressing for gardening activity. Grill gate was provided at the main entrance of the Sarai. The open area of the Sarai was fenced to check the entry of tresspassers.

157. QUILA MUBARAK, PATIALA, DISTRICT PATIALA

The deposit work of Quila Mubarak Patiala was taken up on request from the Punjab Government on the basis of High Court direction. In the first phase repair work to the front side of Ranvas portion was taken up. Four main roofs and a roof of gallery were restored as per original pattern by providing wooden beams, planks, a layer of concrete and finishing the top with a layer of brick tiles. Necessary masonry repairs in these areas were attended to. The cracks in the masonry as well as *chhatris* were stitched by providing dowels, lead filling etc. The *chhajjas* were restored, matching the original.

CHENNAI CIRCLE

TAMIL NADU

158. CLIVE'S HOUSE, FORT ST. GEORGE, DISTRICT CHENNAI

The damaged stone flooring in the northeastern corner of the ground floor was removed and relaid. The walls and wooden members were also painted

In the south-east corner of the ground floor. the entire interior salt affected plaster was removed, thoroughly washed and made salt free. All cracks and voids were plugged before replastering. Also attended to the work of filling wooden joints and electrical connections besides polishing of Nabba stone flooring.

On the north-east corner of the first floor, the walls were colour washed, ceilings white washed and the wooden members were painted.

Low level grill fencing with necessary brick masonry was provided to the eastern side in front of the building. Vegetation in and around the building was removed.

159. TOMB OF DAVID YALE AND JOSEPH HYMERS, DISTRICT CHENNAI

The walls and tower were applied with two coats of approved quality cement paint The iron grills were painted.

160. CONNE.MARA LIBRARY, OL.D BUILDING, EGMORE, CHENNAI (UNDER CIVIL DEPOSIT WORK)

The preservation and restoration of the State Government (Tamil Nadu) owned Connemara Library, old building, Egmore, was taken up by the Chennai Circle of the Survey under Civil Deposit work.

This is a British building in Indo-Saracenic style constructed during 1890-96, built of burnt-bricks with a large rectangular hall, a central nave and aisle on either side. It consists of a wagon-vaulted roof, entirely of wood and the windows decorated with stained glass depicting beautiful geometrical and floral designs. Due to water percolation, the architectural members inside got damaged and leaky. The damaged lime-plaster was removed and the brick core surface was washed after raking out the joints. The base of the same was plastered in machine ground combination mortar, the second layer with machine ground combination mortar to bring out the floral designs and finally a thin coat of hand ground lime-mortar paste was applied over the floral decoration. It was then painted with a coat of primer in the first bay on the western side of the southern wall.

161. MURUGANATHASVAMY TEMPLE, TIRUMURUGANPOONDI, DISTRICT COI.MBATORE

The leaky terrace and the *maha-mandapa* and *mukha-mandapa* were dismantled. The terrace was watertightened with brick jelly concrete in pure lime and then two courses of flat country tiles were laid and plastered with combination mortar and water-proofing compound.

162. NITISVARASVAMY TEMPLE, SRIMUSHNAM, DISTRICT CUDDALORE

The damaged weathering course of the *mukha-mandapa* was removed and relaid with a new one and watertightened. Moss and lichen were completely removed from the Vimana of the Murugan Shrine and the *gopura.*

163. SUGRISVARA TEMPLE AND TANK, SIRCARPERIYAPALAYAM, DISTRICT ERODE

The decayed plaster form the Vimana was removed carefully without causing damage to the brick core from the Siva and Amman Shrines. The damaged Vimana portion of the Siva Shrine was restored and roughly plastered with pure lime. The accumulated earth and vegetation were cleared around the monument.

164. SRI DHENUPURISVARA TEMPLE, MADAMBAKKAM, DISTRICT KANCHIPURAM

The damaged thick weathering course of the front *mandapa* and Amman Shrine was removed and relaid with fresh, weathering course and watertightened.

165. PIRAVATANESVARA TEMPLE, KANCHIPURAM, DISTRICT KANCHIPURAM

The course rubble masonry wall was reconstructed and the existing west entrance gate was removed for providing a masonry toe wall across the main entrance to prevent percolation of rain-water. The gate was refixed at a higher level. Besides an approach road was laid from the main road upto the temple.

166. VAIKUNTHAPERUMAL TEMPLE, KANCHIPURAM, DISTRICT KANCHIPURAM

In view of the proposed *mahakumbha-bhishekam* of the temple, the entire Vimana was watertightened and stucco figures were strengthened, besides pointing, grouting, colour washing etc., were also attended to. The chemical preservative coat was also applied.

The *prakara* wall *{tirumadil)* on the south-west corner of the temple was reconstructed and pointing the joints of the stone steps leading to the tank with cement-mortar was completed.

167. Dolotsava Mandapa, Mamallapuram, District KanchIpuram

During the last decade, due to heavy cyclone, the *gopura* of this *mandapa* was severely damaged and had fallen. The conservation of this challenging work was taken up by providing missing *chhajjas* as per the original. Reconstruction of the fallen *gopura* by providing proper counterweight to the *chhajjas* and the plastering of entire *gopura* with lime-mortar work was completed.

168. Group of Monuments, Mamallapuram, District Kanchipuram

A low level M.S. grill fence over R.R. stone dwarf wall with suitable foundation was provided at Butter ball, i.e., north-east corner of the hillock for 50 m and suitably painted.

169. Dutch Fort and Cemetery, Sadras, District Kanchipuram

The biggest granary located on the north-east corner of the fort was severely damaged. Its vaulted roof had numerous vertical and horizontal cracks. The bricks were eroded severely. The underpinning of the damaged bricks, grouting/filleting of the cracks were taken up besides watertightening the exterior. The entire surface of domical roof was plastered in combination mortar.

170. Kailasanatha Temple, Salabogam, District Kanchipuram

The conservation of main Vimana was taken up, due to weathering of sandstone. To prevent further damage and percolation of water through eroded joints and cavities during rainy-season, the growth of moss and lichen and dead plaster over the Vimana were removed. The damaged portion was carefully restored. Lime-plastering was done all over the exterior surface and all stucco figures from *kalasa* upto the second *tala* were strengthened.

171. NarasimhasVami Temple, Namakkal, District Namakkal

The work of plastering the north wall and the terrace of *madapalli* and watertightening of *mandapa* was done besides completing the plastering, watertightening and mending of the main Vimana and painting of the exterior. The damaged stone flooring *of madapalli* was removed and relaid using old and new stones.

172. Siva Temple, NirpalaNI, District Pudukottai

The closed pillared and outer open *mandapas* were dismantled and reset. The roof was watertightened with terrace tiles, and then plastered. The *prakara* wall was strengthened and the area levelled.

173. Rock-cut Shrine OF PUSHPAVANESVARA, PUVALAKUDY, DISTRICT PUDUKOTTAI

The Amman Shrine which was in highly dilapidated condition was dismantled and reconstructed using old and wherever necessary with new architectural members. Earth work excavation was carried out to expose the *adhishthana* of the Amman Shrine. The damaged brick portions of main Vimana was reconstructed from available clues, after mending the ornamental moulding, wherever necessary. The surface was plastered with hand ground lime-mortar paste, over which a coat of acrylic cement paint of matching colour was applied.

174. TEMPLES OF SIVA AND VISHNU, TIRUMAYAM, DISTRICT PUDUKOTTAI

These two temples situated within one *tirumadil* are partly rock-cut cave and partly structural. All the Vimanas of these temples were watertightened and stucco figures strengthened after deplastering the dead mortar. The decayed and dead lime-plaster of *tirumadil* coping wall was removed and then replastered with combination mortar. The stone flooring in front of the *gopura* was relaid using available old stones and provided new cut stone steps in front of the entrance. The broken and damaged brick coping near the *madapalli* was mended and plastered.

The broken *prastara* stone slab was restored by inserting iron rod and packing with araldite. The accretionary brick wall near the Tirumeyyar Shrine was removed and an iron grill was provided to safeguard the bronzes.

Earthwork excavation was carried out to remove the accumulated earth in front of the main entrance and the *adhishthana* moulding was exposed. A groove was cut carefully in the bed-rock in Tirumeyyar Shrine to properly drain out the *abhisheka* water.

175. AGASTISVARA TEMPLE, VELLANUR, DISTRICT PUDUKOTTAI

The Raja *gopura,* Amman, Siva and Sub-shrine Vimanas were watertightened and the stucco figures and the *prakara* wall were strengthened.

176. SIVA TEMPLE, VISALUR, DISTRICT PUDUKOTTAI

The damaged compound wall was conserved and colour washed. A proper drainage was laid to drain out the rain-water.

177. AIRAVATESVARA TEMPLE, DARASURAM, DISTRICT THANJAVUR

In continuation of the earlier *{1998-99,* pp. 288-289) work, major conservation was .undertaken to restore the *mahadvara* after dismantling. It was restored upto the five rows from *upana* on the southern wing. This year the work of restoration of the southern wing of the *mahadvara* was completed. The outer veneer stone walls restored as per original using mainly the old stones found during earth work excavation.

178. PANCHANADISVARA TEMPLE, MANNADIPET, DISTRICT TIRUVANDARKOIL

Earthwork excavation was carried out to expose the original plinth level of the Amman Shrine.

179. JAINA TEMPLE, TIRUMALAI, DISTRICT TIRUVANNAMALAI

The Vimana of the temple was strengthened and watertightened. The cracks were plugged by grouting and the broken parts mended. The dead plaster was removed and replastered. The joints were raked out and pointed using combination mortar. The broken stucco figures were mended as per original.

The leaky roof of the *mukha-mandapa* was watertightened after carefully removing the dead weathered course. The roof was relaid giving a proper slope.

180. DELHI GATE, ARCOT, DISTRICT VELLORE

The dead plaster from the outer walls and ornamented portion was removed and replastered as per original. The breached portion of the revetment and compound wall was reconstructed with proper alignment as per the original design and given a colour

wash with anti-corrossive acrylic paint over a coat of primer on the exterior walls.

181. BRAHMAPURISVARA TEMPLE, BRAHMADESAM, DISTRICT VILLUPURAM

The dead weathered course over cloister *mandapa* on the western side was removed. The ceiling stone slabs on the western side and northern side of the temple, beams and veneering stone members of sunken wall on western side were carefully removed after proper documentation and stacked properly for reuse. On the northern and western sides the inner and outer veneer stone wall was reconstructed to plumb and core in-between the veneering stone wall was filled with rubble stone in combination mortar. The beams and ceiling slabs were re-erected in its original position.

182. FORT-COMPLEX AND TEMPLES, GINGEE, DISTRICT VILLUPURAM

The debris inside the cells and corridor at the northern side of the Palace site in the Rajagiri Fort was carefully removed to expose the original flooring, pillar base and original drainage.

Earthwork excavation was carried out to expose the plinth of all the cells and the existing drainage system was cleaned to drain out the rain-water.

The dead plaster of the walls were removed and fresh plaster applied. After dismantling the damaged weathered material of the terrace over the cells, a fresh weathering course was laid. The top surface was plastered with combination mortar.

183. KALYANA MAHAL, GINGEE, DISTRICT VILLUPURAM

The old dead plaster of the stepped-tank *{nirali-mandapa)* was carefully removed for replastering the same. While deplastering, the original fountain with terracotta pipe were restored using new ones, matching the original and the steps were replastered. The original flooring, the drain for water to flow into the Kalyana Mahal tank and the sides of the entrance were conserved.

184. VENKATARAMANA TEMPLE, GINGEE, DISTRICT VILLUPURAM

The low level walls on the western and southern sides of the temple were raised to prevent entry through these sides. Earthwork excavation was carried out on the southern and western sides to expose the plinth level.

The out-of-plumb rubble stone wall was reconstructed on new foundation with brick coping after dismantling the same.

DHARWAD CIRCLE

KARNATAKA

185.GALAGANATHAGROIPOI TEMPLES, AIHOLE, DISTRICT BAGALKOT

The collapsed and fallen portion of the compound wall on the northern and eastern sides was reconstructed to a length of 130 m in roughly dressed-stone masonry, set in cement-mortar to enclose and safe guard the archaeological area.

186. JYOTIRLINGA GROUP TEMPLES, AIHOLE, DISTRICT BAGALKOT

The dislodged and disturbed stone members such as roof slabs, beams, capital pillars and wall of the entire temple-complex were properly documented for reconstruction using the same stones upto the plinth level after strengthening the foundation.

187, VENIYARGUDI , AIHOLE, DISTRICT BAGALKOT

The temple developed wide gaps due to settlement of the foundation. The sunken stone members of the foundation plinth, *kakshasana* stones, pillar base, pillars, capitals, walls, ceiling slabs of the main temple were removed after proper documentation and preserved near the site. After laying foundation, the plinth was reassembled.

188. Ac; vs i v a Teertha Tank, Badami, District Bagalkot

The fallen and dislodged stone masonry retaining wall on the southern side of Durgamma Temple was dismantled and reconstructed to plumb after providing suitable foundation in cement-concrete to a length of 3 7.00 m.

189. Mallikarjuna Temple, Pattadakal, District Bagalkot

The dislodged and sunken stone slab paving on the northern portion was removed to a length of 20.00 m and relaid over a bed of cement-concrete with a slope to drain off the surface water.

190. Cams, Badami, District Bagalkot

To check unauthorized entry into the premises, a new iron gate was fixed with size stone masonry pillars at the main entrance.

191. North Fort, Badami, District Bagalkot

A size stone masonry drain was constructed on the rear side of the museum building to prevent stagnation of rain-water thus causing seepage.

192. Three European Graves, Bhatkal

The archaeological area around the monument was levelled by earthwork excavation. The damaged plaster of the tombs and platform was removed and the surface was re-plastered in cement-mortar.

193. Old Jaina Temple, South-East of Kamal Basti, Belgaum, District Belgaum

The broken beams and ceiling slabs were removed after erection of necessary scaffolding. They were mended and refixed in their original position. The roof was watertightened by laying brick-jelly concrete after pointing the joints.

194. Kamal Basti, Belgaum, District Belgaum

The broken ceiling slabs of the *maha-mandapa* with a clerestory window were mended. The roof earlier covered with cement-concrete, had developed cracks. These were filled in by brick jelly concrete and pointed, followed by plastering to make it waterproof and relaid with fresh brick jelly concrete. The plinth portion apron was laid with new granite stone slabs.

195. Panchalingesvara Temple, Hooli, District Belgaum

The leaky-roof was relaid with fresh lime brick jelly concrete and finished the surface with a course of machine pressed clay tiles after removing the layers of damaged concrete. A sandstone apron around the temple was laid over a cement-concrete bed to prevent seepage of water into the foundation. The area around the temple was levelled by necessary earthwork excavation, and a garden was developed.

196. Ahmed Shah Wali Tomb, Asthur, Bidar, District Bidar

The decayed plaster from the exterior wall surface on the four sides of the tomb was completely

removed and replastered using well seasoned lime-mortar.

197. GOL-GUMBAZ, BIJAPUR, DISTRICT BIJAPUR

The arched-openings of the minarets on the south-east and north-west were provided with grills for security. Grills were also provided to the mosque in order to stop unauthorized prayers. The walls of the mosque were painted. The dislodged portion of the compound wall on the western side was dismantled and reconstructed in random rubble masonry, set in cement-mortar, to enclose the archaeological area to stop encroachment,

198. JUMMA MASJID, BIJAPUR, DISTRICT BIJAPUR

The dead plaster over the wall surface and pillars of the prayer hall was removed and replastered with lime-mortar. The original plaster on the wall, which was covered with lime-coat was removed and the surface was lime-plastered and finished suitably. The area around the mosque was levelled by necessary earthwork excavation. The acquired area was secured by erecting a grill over a dwarf wall on the eastern and the northern sides.

199. IBRAHIM-RAUZA, BIJAPUR, DISTRICT BIJAPUR

The existing barbed-wire fencing on the northern and the eastern sides was removed. A new dwarf masonry wall of requisite height was raised along the area. Levelled grills of matching dsigns were fixed over this wall to enclose the area.

200. DATTATREYA TEMPLE, CHATTARKI, DISTRICT BIJAPUR

The damaged compound wall constructed in mud-mortar on the western, northern, southern and eastern sides was carefully dismantled and reconstructed with the same stones in cement-mortar.

201. FORT, GILBARGA, DISTRICT GULBARGA

The rank vegetation covering the wall and battlements was removed. The damaged Merlons were reconstructed as per original. Steps were reconstructed to the Ranamandala structure and also a tubular railing was provided on its rear side along the steps leading to the Cannon.

202. GREAT MOSQUE, GULBARGA, DISTRICT GULBARGA

The dead plaster over the domes of the mosque was removed completely and replastered the same with fresh waterproof lime-mortar.

203. HAFT GUMBAZ, GULBARGA, DISTRICT GULBARGA

A compound wall on the eastern and northeastern comers was constructed to a length of 142 m of rubble stone masonry set in cement-mortar lo enclose the archaeological area as also to stop vandalism by restricting entry during night.

204. SARVESVARA TEMPLE, NAREGAL., DISTRICT HAVERI

The existing decayed lime-concrete over the roof of the temple was removed and fresh brick jelly concrete mixed with lime was laid and finished with a layer of machine pressed clay tiles set in cement-mortar. The damaged outer veneering wall of the shrine was dismantled and reconstructed to proper position. An approach road was laid.

205. SIDDESVARA TEMPIE, HAVERI, DISTRICT HAVERI

A new stone masonry wall of requisite height was constructed along the periphery of the archaeological area on the southern side to a length of 120.00 m to stop encroachment.

206. CHATIURMUKHA BASTI, GERASOPPA, DISTRICT UTTARA KANARA

The fallen and bulged-out original *prakara* wall

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was reconstructed after laying strong foundation.

207. CHANDRANATHA BASTI, HADAVALLI, DISTRICT UTTARA KANARA

The fallen portion *of the prakara* wall around the monument was reconstructed with literate stone machinery set in cement-mortar. Coping stones with literate stones were provided after dressing as per the original.

208. FORT, MIRJAN, DISTRICT UTTARA KANARA

The fallen northeastern bastion was reconstructed with available stones. The thick vegetational growth over the fort wall was removed and the roots which have penetrated well inside the fabric were removed without disturbing the structure.

209. MADHAKESVARA TEMPLE, BANAVASI, DISTRICT UTTARA KANARA

The dead cement-concrete over the roof of the main temple was dismantled completely and fresh brick jelly concrete was laid and finished with a layer of machine pressed clay tiles set over cement-mortar to the required slope. The dead plaster of the parapet wall was removed completely and replastered to stop seepage of water through the wall. The missing portion of compound wall was reconstructed with stone masonry after providing proper foundation near the main entrance.

210. MONUMENTS, BILAGI, DISTRICT UTTARA KANARA

A retaining wall in laterite stones was constructed and the damaged stone steps leading to the main entrance was reconstructed as per original.

211. SIVA TEMPLE, SOMASAGAR, DISTRICT UTTARA KANARA

The damaged concrete and accumulated earth over the roof of the temple was removed completely. Fresh brick-jelly concrete was laid to proper slope and the surface was provided with machine pressed clay tiles and joints were pointed. The *gopura* was watertightened by raking out the dead mortar in-between the stone joints and fresh pointing was done. To avoid stagnation of rain-water on the rear side of the temple, a stone masonry drain was also constructed.

212. MONUMENTS, SONDA, DISTRICT UTTARA KANARA

The archaeological area around the temple was levelled by earthwork excavation and the accumulated debris was cleared. An approach road was laid to the monument. A masonry wall of laterite stone of requisite height was raised around the periphery of the Siva temple. The roof of the temple was watertightened by laying fresh brick-jelly concrete. A channel was also cut to drain off the accumulated rain-water around the temple,

GUWAHATI CIRCLE

ARUNACHAL PRADESH

213. RUINS, BHISMAKNAGAR, DISTRICT DEBANG VALLEY

Approach pathway with necessary bridges at several points was provided besides attending to the work of restoration of barbed-wire fencing, clearing of jungle and vegetation, conservation of dilapidated brick structure.

ASSAM

214. IDGAH, PANBARI, DISTRICT DHUBRI

Compound walls were cordoned with barbed-wire fencing in addition to levelling.

215. RANGAMATI MOSQUE, PANBARI, DISTRICT DHUBRI

Platform of terracotta tiles was provided in front of the mosque and the damaged portions of the

compound wall were conserved. Ornamental work of the mosque in the front side was duly restored.

216. SHRI SHRI SURYA PAHAR RUINS, DISTRICT GOALPARA

Construction of pillared *mandapa,* protective grills, stone paved flooring and face lifting of the rock-cut *bara bhuja* Vishnu-complex was taken up.

Stair cases, leading to Jaina Cave 1, was provided from Ganesa *kunda.*

Levelling, stone pavement, work in front of the Jaina Cave 1 were attended to besides providing proper drainage. Work to restore the flight of steps towards the Jaina Cave II, above the Jaina Cave 1, is in progress.

Construction of retaining wall with fixed G.I. pipe railing in front of Jaina Cave 1 was done. Building of a sculpture shed for display of loose antiquities is in progress.

217. MONOLITHIC STONES, KASOMARI PATHOR, DISTRICT GOLAGHAT

Megaliths were provided with barbed-wire fencing.

218. GROUP OF FOUR MAIDAMS AT CHARAIDEO, DISTRICT SIBSAGAR

Besides clearing the vegetation approach road was laid from the main gate to the *maidams.*

219. GOLAGHAR, JOYSAGAR, DISTRICT SIBSAGAR

Brick paved approach road was constructed connecting the monument with the main road. Construction of compound wall with barbed-wire fencing and grill work, on the front side, were attended to in addition to the repairing work of the superstructure.

220. SIBDOL, JOYSAGAR, DISTRICT SIBSAGAR

The damaged fencing was replaced by dwarf wall and a grill in the front side along with barbed-wire fencing on other three sides. Turn style gate and one main gate with two leaves in front of the temple were also fixed.

221. VISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR

The barbed-wire fencing with dwarf wall was replaced, ornamental grill gate was fixed in the front side besides a turn style gate.

222. RUINS OF MASONRY REMAINS, BAMUNI HILI, DISTRICT SONTTPUR

Brick paved *pucca* pathway was provided besides constructing dwarf buttress wall to prevent the soil erosion. R.C.C. pillars with barbed-wire fencing was also provided for safety and security to the ruins. On the entrance, a grill gate was fixed, connected with flight of steps constructed from bottom to hill slope.

223. BORDOL TEMPLE, BISVANATHAGHAT, DISTRICT SONITPUR

Dwarf wall was provided with barbed-wire fencing and the area was thoroughly cleaned in addition to *sikhara* portion which was made water-tight.

224. MOUND WITH RUINS OF STONE TEMPLE, DAH PARVATIYA, DISTRICT SONTTPUR

Compound wall was provided with grill gate in the front side. Back side of the monument is enclosed with barbed-wire fencing.

225. RUINS, SINGRI HILL, DISTRICT SONTTPUR

A dwarf wall, covering an area of 120 m was provided with barbed-wire fencing on the western side of the complex, besides east, south and partly on the

northern side. Platforms with low height were constructed to display important sculptures and architectural pieces. The site was also thoroughly cleaned.

MANIPUR

226. VISHM TEMPLE, BISHENPUR, DISTRICT BISHNUPUR

Construction of dwarf compound wall with barbed-wire fencing at the top around the monuments, is in progress.

NAGALAND

227, CACHARI RUNS, DIMAPUR, NAGALAND

The construction of compound wall with barbed-wire fencing in the front side of the monument-complex, is in progress.

TRIPURA

228. ROCK-CUT SCULPTURES, UNAKOTI, DISTRICT NORTH TRIPURA

Construction of one bridge across the *nala* was taken up. The work for the other bridge is in progress. The building for a museum at Unakoti is under construction for preservation and display of loose sculptures.

229. BHUBANESVARI TEMPLE, UDAIPUR, DISTRICT SOUTH TRIPURA

A brick compound wall mounted by barbed-wire fencing with ornamental grill on front side was provided.

230. CHATURDASA DEVATA TEMPLE, UDAIPUR, DISTRICT SOUTH TRIPURA

Conservation work of ancient compound wall around the Chaturdasa Devta Temple was attended to.

231. THAKURANI TILLA, PILI.AK, DISTRICT SOUTH TRIPURA

A compound wall with barbed-wire fencing on top, and two gates, one on the north and the other on the southern side were provided.

HYDERABAD CIRCLE

ANDHRA PRADESH

232. GROUP OF TEMPLES, LEPAKSHI, DISTRICT ANANTAPUR

Resetting of undulated flooring inside the temples and around the *mandapa* and other structural repairs are in progress.

233. RAMA'S BASTION, PENUKONDA, DISTRICT ANANTAPUR

The work of reconstruction of the collapsed portion of the fort wall with available stones at Rama's bastion and repairs to the brick structure above the Rama's bastion were completed.

234. SRI PARASURAMESVARASVAMY TEMPLE, GUDIMALLAM, DISTRICT CHITTOOR

The old, damaged fencing consisting of 'L' angle posts and diamond mesh was removed and after constructing a dwarf wall and fixing the 'L'angle posts, crimped wire mesh frames were fixed. Old decayed plaster from the Vimana and the compound wall was removed and replastering was done with hydrated lime-mortar. The decayed wooden rafters of the *garbhagriha* were replaced with new ones. The ventilators were provided with 6 mm wire mesh. The area inside the *prakara* wall was levelled by

removing the debris. The broken floor-slabs of the sanctum were also removed and replaced with the new ones.

235. SRI CHENNAKESAVASVAMY TEMPLE, SOMPALLI DISTRICT CHITTOOR

Watertightening the *gopura* and fencing around the temple were completed.

236. SRI MUKUNTESVARASVAMY AND OLD VISHNU TEMPLE, PEDDAMUDIAM, DISTRICT CUDDAPAH

After clearing the rank vegetation, earthwork excavation was done for levelling the area around the temple. After laying the foundation (using cement-concrete 1:4:8 with 40 mm HBG metal), a dwarf wall *of taki* stone in cement-mortar was constructed and after fixing angle iron posts, barbed-wire was tied to it on the western, northern and southern sides of the temple.

The dead and decayed lime-plaster and concrete over the roof of the Sri Mukuntesvara and old Vishnu temple were removed. The Navagraha temple was opened and the roof-slabs, beams, brackets and columns were carefully stacked. The damaged and out-of-plumb retaining wall on the western side was carefully opened. A layer of brick-gel lime-concrete was laid above the temple after removing the accumulated debris.

237. SRI VISVANATHASVAMY TEMPLE, SIVALAPALLI, PUSHPAGIRI, DISTRICT CUDDAPAH

The existing damaged barbed-wire fencing around the temple was removed and earthwork excavation was done for laying foundation for constructing a dwarf wall. The deteriorated lime-concrete over the roof of the temple was removed and its roof slabs, beams, capitals, pillars etc., were also removed and neatly stacked. The cuddapah slabs from inside the temple were also removed. The work is in progress.

238. SRI KODANDARAMASVAMY TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH

The work of plastering the *gopura* with 12 mm thick plaster was taken up for uniformly levelling and applying a further coat of 3 mm of fine coat of stucco plaster. The central hollow niches in each *tala* of the *gopura* are fixed with rafter frames of country wood. Mending of the stucco figures on *gopura* with hand ground CLM in 1:1:3 plaster was in progress. Drilled a 6 *Vi"* dia bore well to a depth of 90 m and the same was fixed with 5 H.P. submersible motor pump for supply of drinking water as also for developing a garden.

239. SRI BHIMESVARASVAMY TEMPLE, DRAKSHARAMA, DISTRICT EAST GODAVARI

Damaged, disturbed and sunken stone coping on eastern side and north-east corner of outer main *prakara* was removed, the core was filled in with brick jelly lime-concrete and re-laid with new one and the top surface was plastered with lime-plaster matching with the original. The open courtyard inside the temple-complex was levelled to develop a garden. For fencing, the protected area was cleaned and the work of construction of dwarf RR masonry wall is in progress.

240. GOLINGESVARASVAMY TEMPLE, BICCAVOLU, DISTRICT EAST GODAVARI

Structural repairs like strengthening the brick masonry, replastering and levelling the area were completed.

241. SRI KUMARARAMA BHIMESVARA TEMPLE, SAMALKOT, DISTRICT EAST GODAVARI

After Removing the decayed pointing from the external face of inner *prakara* wall, recess pointing was done with CLM 1:1:6 in matching colour. The western *mandapa* was dismantled after proper documentation and new concrete foundation was laid. The joints of the roof-slabs of this *mandapa* were

filled with brick jelly concrete and fixed two layers of flat tiles over the *mandapa.* The old, damaged and undulated flooring stone slabs from south side *mandapa* pathway, inner and outer platform on its either side, southern entrance *mandapa* pathway, and western gateway were removed and relaid with new dressed granite stone flooring slabs. The disturbed ancient stone platform around the Ekasila Golla Stambham, was removed and reset. G.I. pipe railing was provided to the *nandi-mandapam* of first floor.

242. MAHASTUPA, AMARAVATI, DISTRICT GUNTUR

Fencing to Traveller's bungalow at Amaravati by earthwork excavation for laying foundation, constructing a dwarf CR masonry wall, pointing and coping on the top of this wall, fixing of 'L' angle posts with diamond mesh frames and painting of these posts and frames, were completed.

243. SRI BHAVANARAYANASVAMY TEMPLE, BAPATLA, DISTRICT GUNTUR

In order to stop percolation of rain-water into the *garbhagriha* of the temple, earthwork excavation for levelling the area around the temple was taken up. Cement-concrete was laid all around the *adhishthana* and a brick retaining wall was constructed to prevent caving in of the earth. A water collection chamber was constructed to collect rain-water which was taken out by a pump. Mending of broken lintel beam of southern *gopura* was also completed.

244. FORT WALL ON HILL TOP, NAGARJUNAKONDA, DISTRICT GUNTUR

The work of construction of the fallen fort wall and bastions and the reconstruction of dilapidated entrance *mandapa* called elephant pass on the hill-top at Nagarjunakonda was done.

245. NAGARJUNAKONDA, DISTRICT GUNTUR

To drain out the rain-water to stop leakage, the holes to the parapet wall of the Museum building on the hill-top were made in addition to the completion of resetting the fallen breaches of the fort-wall with available stone members.

246. BUDDHIST REMAINS, GRANDHASIRI, DISTRICT GUNTUR

The work of providing fencing around the protected area and developing the environs was completed.

247. ROCK-CUT CAVE TEMPLE, UNDAVALLI, DISTRICT GUNTUR

The work of watertightening the leaky roof and developing the environs was completed.

248. BANJARA DARWAZA, GOLCONDA FORT, DISTRICT HYDERABAD

The work of construction of dwarf wall and fixing of diamond mesh frames was completed to enclose the open area and also a small garden was laid to improve the environs. The openings in the arched platforms on either side was provided with iron grills to stop its misuse.

249. DAD MAHAL, GOLKONDA FORT, HYDERABAD, DISTRICT HYDERABAD

The work like underpinning, pointing the walls of the Dad Mahal, clearance of debris in front of it for laying garden, watertightening the roofs etc. were completed.

250. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD

The work of laying electric cabin for lights at different places, patch plastering and painting is in progress.

251. DARBAR HALL, GOLCONDA FORT, DISTRICT HYDERABAD

The pathway inside the fort were highly uneven and at few places they were eroded by the flow of rain-water. For easy and smooth movement of visitors, roughly-dressed stone pitched pathway was provided matching the ancient environment from garden to entrance gate and Akkanna Madanna offices to the flight of steps leading to Darbar hall. A concrete apron was also laid on both sides of these pathways to stop its damage by flowing rain-water.

252. FORTIFICATION WALL, GOLKONDA FORT, DISTRICT HYDERABAD

Thick vegetation grown on the outer fort walls, gateways, bastions and in the open area of Balahissar was cleared by trimming neatly the vegetational growth and removing roots carefully. The work was completed.

253. IBRAHIM'S MOSQUE, GOLKONDA FORT, HYDERABAD, DISTRICT HYDERABAD

After cleaning the walls and the minarets, plastering was done along with a final coat of lime-plaster. The ornamental stucco designs were also mended.

254. LADIES DRESSING HALL, RAM MAHAL-COMPLEX AND ZANANA MOSQUE, GOLKONDA FORT, HYDERABAD, DISTRICT HYDERABAD

Fixing of grills to the ladies dressing hall in Ranimahal-complex and Zanana mosque was completed. The accumulated debris inside the cells of Rani Mahal was removed and the exposed structures were strengthened.

255. TARAMATI MOSQUE, GOLCONDA Four, DISTRICT HYDERABAD

The restoration of damaged parapet wall over Rani Mahal and different structures on both sides of the pathway between Aslah Khana and Rani Mahal were taken up by underpinning and pointing with a view to stabilize the ancient remains as also to improve the environs.

256. BANDAR FORT, MACHILIPATNAM, DISTRICT KRISHNA

Removal of fallen debris from inside the compound was completed. After the earthwork excavation and laying of concrete foundation, a brick masonry compound wall was constructed around the building. After earthwork excavation and laying of concrete foundation at the breach of north side wall of the building, the construction of brick masonry wall above the ground level is in progress. Fixing of doors and windows to the proposed storeroom was also completed including the work of painting the above doors and windows.

257. ABDUL WAHAB KHAN TOMB, KURNOOL , DISTRICT KURNOOL

The work of watertightening the leaky roof, attending to the colour wash at the faded portions as per the existing pattern and jungle clearance within the fencing, developing environs etc. were completed.

258. NAVABRAHMA GROUP OF TEMPLES, ALAMPUR, DISTRICT MAHABOOBNAGAR

A screen-wall over a concrete bed in-between Svarga Brahma Temple and the existing local burial ground was constructed. A drain from the Visva, Veera and Arka Brahma Temple-complex was constructed to drain out the rain-water during the rainy-season. Removal and resetting of disturbed and undulated flooring of the *pradakshinapatha* platform, including providing new red sandstones at missing portions around the above complex was completed. The work of watertightening the leaky roof, providing fencing and developing garden around the complex and the construction of a dwarf

wall from the rear side of Padma Brahma Temple of Garuda Brahma for developing its environs is in progress.

259.PAPANASI GROUP OF TEMPLES, ALAMPUR, DISTRICT MAHABOOBNAGAR

Besides maintaining the lawns, the *dhoob* grass lawns were extended as per the approved stretch and rose plants and flower beds were laid in front of the reconstructed temple.

260. GROUP OF TEMPLES, UDAYAGIRI, DISTRICT NELLORE

Repairs to *gopura* of Sri Ranganayakula Temple and resetting the *kalyana mandapa,* minor repairs to the other temples etc. were completed.

261. SRI RANGANAYAKULASVAMY TEMPLE, UDAYAGIRI, DISTRICT NELLORE

The work of providing waterproof course over the roof of the *Alankara mandapa,* adjacent the southern *gopura,* was completed to stop leakage. On the north-east corner of the temple-complex, a bore well was dug for supply of water. Fencing on the eastern side of the temple was taken up by attending the construction of a dwarf CR masonry wall, pointing, fixing of 'L' angle iron posts over the dwarf wall and fixing of GI chain linked mesh to the iron posts.

262. ANCIENT MOUND, RAMATHIRTHAM, DISTRICT NELLORE

The work of providing GI barbed-wire fencing around the ancient mound with pre-cast RCC posts was completed besides providing grilled iron gate for fencing.

263. ROCK-CUT CAVES, BHAIRAVAKONDA, DISTRICT PRAKASAM

Watertightening the caves, jungle clearance, developing the environs etc., were attended to.

264. BUDDHIST REMAINS, BOJJANNAKONDA AND LINGALAKONDA, SANKARAM, DISTRICT VISHAKHAPATNAM

The brick structures like *maha-chaitya* monastic cells etc., over the Bojjannakonda were strengthened with specially manufactured new bricks of ancient size and the top surface of these structures were watertightened, besides providing steps and pathways to the groups of rock-cut votive stupas. The work is in progress.

265. DURGA BHAIRAVAKONDA, NEELAVATI, DISTRICT VIZIAYANAGARAM

Remaining fencing work around the protected area was completed apart from providing a bore well at the site.

266. THOUSAND PILLARED TEMPLE, HANUMAKONDA, DISTRICT WARANGAL

The work of resetting the architectural members, *pradakshinapatha* between north-east corner of Surya shrine and *nandi,* back into their original position over a new foundation, including providing missing ornamental members, was completed.

JAIPUR CIRCLE

RAJASTHAN

267. ANCIENT SITE, BHANGARH, DISTRICT ALWAR

The buried shops on the southern side from shop No. 60 to the remaining ones were exposed and repairs carried out by way of RR masonry, sunk pointing of the repaired walls with LCM mixed with brick zeera as per original pattern was done.

Exposing the buried fortification wall and

bastion on the northern side Nos. IV to V by digging and removing the debris away from the structures, restoration of fortification wall with RR stone masonry in LCM including recessed pointing is in progress.

In Mahal ramp and retaining wall, sunk pointing of RR masonry in LCM mixed with brick zeera, restoration of ramp and retaining wall were carried out with RR stone masonry in lime-cement mortar.

In Gopinath Temple core masonry work of plinth platform with RR stone masonry in LCM, core treatment with LCM and resetting of veneering stones of plinth using old dismantled stone as per the original pattern was taken up and the work is in progress. Underpinning with RR stone masonry, taking out the dislodged and loose stones of apron and resetting the same were taken up.

RR stone masonry and pointing in LCM in walls of Mahal were undertaken.

268. BAGH-KI-DEORI, NEELKANTH, DISTRICT ALWAR

After dismantling of old, decayed, sunken RR stone flooring, the work of laying lime-cement concrete, providing plain RR stone flooring and sunk pointing of the floor with LCM mixed with brick zeera was done.

269. LAI. MASJID, TIJARA, DISTRICT ALWAR

The platform with steps and fallen portion of the above were partly restored with RR stone masonry and pointing in LCM, besides removal of debris including dressing and levelling of the uneven area were carried out.

270. RUINS OF TEMPLES, ATRU, DISTRICT BARAN

For the purpose of providing a temporary sculpture shed, dismantling the old, decayed and loose RR masonry of the existing structure near Ganesa Temple is in progress.

271. FORT, BAYANA, DISTRICT BHARATPUR

Restoration of approach road from first gate to second gate of Bayana Fort is in progress by excavating the undulated old pathway, collection of RR stones and reconstruction of the path with RR masonry in LCM.

272. JAHANGIR GATEWAY, BAYANA, DISTRICT BHARATPUR

Excavation of foundation, laying of lime-cement concrete. RR masonry, filling the earth mixed with boulders were taken up.

273. USA MANDIR, BAYANA, DISTRICT BHARATPUR

Painting of the iron grill, laying the stone slab flooring in the verandah adjoining the temple, clearance of the front portion of the temple by removing the *malba,* were done.

274. FORT, BHARATPUR, DISTRICT BHARATPUR

Underpinning of the fort walls with RR masonry and pointing of the same were done.

275. DIG. PALACE, DIG, DISTRICT BHARATPUR

Materials were collected for repairs to the collapsed roof between over head tank and Hardeo Bhavan and also for repairs to southern side of Hardeo Bhavan.

276. KACHCHA BAGH, DIG, DISTRICT BHARATPUR

The damaged compound wall was restored by RR masonry in LCM.

277. WALL PAINTINGS, BUNDI PALACE, DISTRICT BUNDI

Dismantling of decayed plaster of the outer walls of Chitrashala and replastering the same in LCM are in progress.

278. FORT, CHITTAURGARH, DISTRICT CHITTAURGARH

A portion of *kachcha* pathway in the Padmini palace was provided with stone flooring. Improvement of rear area of Samidhesvara Temple is in progress and the bed of Ghee-ki-Baori was also cleared by removing the earth.

279. MAHANAL TEMPLE AND MATH, MENAL, DISTRICT CHITTAURGARH

Dismantling of RR stone masonry of a portion of western side fortification wall was attended to and the work is in progress.

280. SOMANATHA TEMPLE, DEO SOMNATH, DISTRICT DUNGARPUR

Sunk pointing on the exterior faces of *sikhara* of the main temple in combination mortar for strengthening the *sikhara* portion was done. The drain from *garbhagriha* to the exterior was made functional by exposing and clearing it, providing stone slab covers and making chamber besides pipe line from exterior of the temple premises top to the river for draining out water from *garbhagriha.*

281. FORT, BHATNER, DISTRICT HANUMANGARH

Repairing of old *lakhauri* brick masonry in patches of the fortification wall and bastion (Nos. 46 to 48) in LCM mixed with brick zeera was carried out.

282. JAMA MASJID, AMBER, DISTRICT JAIPUR

The work of underpinning with RR stone masonry in lime-cement mortar in walls, lime-cement plaster on the dome and removal of debris was taken up.

283. SRI JAGAT SHIROMANI TEMPLE, AMBER, DISTRICT JAIPUR

The work of underpinning with RR stone masonry in walls, lime-cement mortar on outer and inner surfaces of walls including removal of debris was carried out.

284. EXCAVATED SITE, BAIRAT, DISTRICT JAIPUR

Masonry work with old bricks in lime-cement mortar for stupa and removal of grass and vegetation were taken up.

285. FORT INCLUDING TEMPLES, JAISALMER, DISTRICT JAISALMER

The collapsed, decayed and buldged portion of lower fortification wall was dismantled and reconstructed partly with ashlar masonry of heavy stones in two line dressing for facing and partly in rubble stone in interior of the wall. Also loose/decayed stones of ashlar masonry of the upper bastion were taken out and new dressed stones were fixed in LCM.

286. BUDDHIST CAVES, KOLVI, DISTRICT JHALAWAR

Construction of a portion of parapet wall with RR masonry in lime-cement mortar was done.

287. FORT, MANDORE, DISTRICT JODHPUR

RR stone masonry in lime-cement mortar for lower terrace of the Brahma Temple was done. In Nahar Singhji-Ka-Temple dismantling the old and decayed stone slabs on the top of the platform, dislodged RR masonry of the walls of the platform, reconstruction of the walls of the platform and providing pathway with RR stone masonry in LCM were carried out.

288. TEMPLE, FORTWALL AND STATUES DARA, DISTRICT KOTA

Dismantling of plaster on the walls of the main and the inner complex, replastering in LCM, replacing damaged/broken *chhajja* stones and *dasa* stones, repairing the small tank inside by laying a fresh layer of concrete in the bed, plastering etc., providing concrete approach road from the main gate to monument to the first entrance were undertaken.

289. FORT, KUMBHALGARH, DISTRICT RAJSAMAND

Construction of approach road from Vedi Temple to Jaina Temple with RR stone masonry in LCM with brick zeera to match with old structures after digging, cutting the hard rocks and removing hard soil mixed with stone boulders were carried out.

Restoration of old/missing RR stone masonry of tank in southern annexe at Pagra Pol, dismantling of loose decayed plaster and re-plastering were done as per original.

290. FORT, RANTHAMBOR, DISTRICT SAWAI MADHOPUR

Restoration of the fort-wall from Supari Mahal to Delhi Gate with RR masonry in LCM at fallen portions and sunk pointing the repaired stone masonry were carried out. Levelling of the area in front of Ganesa Temple was also carried out.

291. HARSH NATH TEMPLE, HARSH, DISTRICT SIKAR

Re-construction of RR masonry in LCM and plastering on repaired boundary wall and cell in LCM mixed with brick zeera was carried out in Bhairon Temple.

Dismantling of old, decayed, uneven and broken stones of approach road and steps between Harshnath Temple and Bhairon Temple and relaying of pathway with plain stones matching the original were done.

Approach road with RR masonry upto parking area to facilitate movement of devotees was provided.

292. SAS BAHU TEMPLE, NAGDA, DISTRICT UDAIPUR

RR masonry pathway around the temple for facility of the visitors was completed.

KOLKATA CIRCLE

WEST BENGAL

293. GOKULCHAND TEMPLE, GOKULNAGAR, DISTRICT BANKURA

Restoration and resetting of out-of-plumb and bulged-out stone architectural members on the front facades of the walls on eastern and western sides of *nata-mandapa* was done. Foundation of the said walls was strengthened by inserting RCC raft and out-of-plumb stone architectural members were reset.

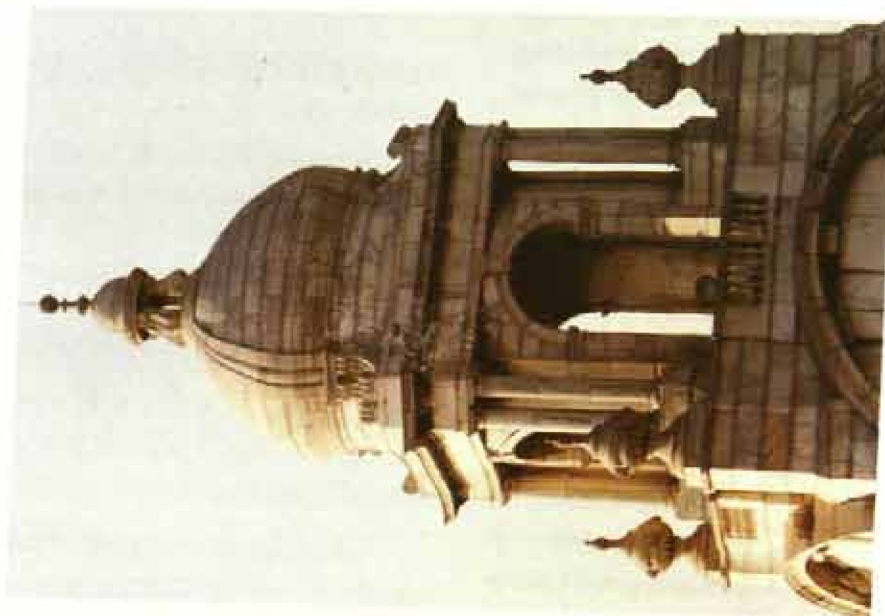
294. SHYAMSUNDAR TEMPLE, MADANPUR, DISTRICT BANKURA

After removal of old dead plaster from inner walls of temples, the work of re-plastering was done besides attending to the ornamental brick work on the pillars and walls providing a brick apron. Parapet wall on *chains* of each side of the temple was removed.

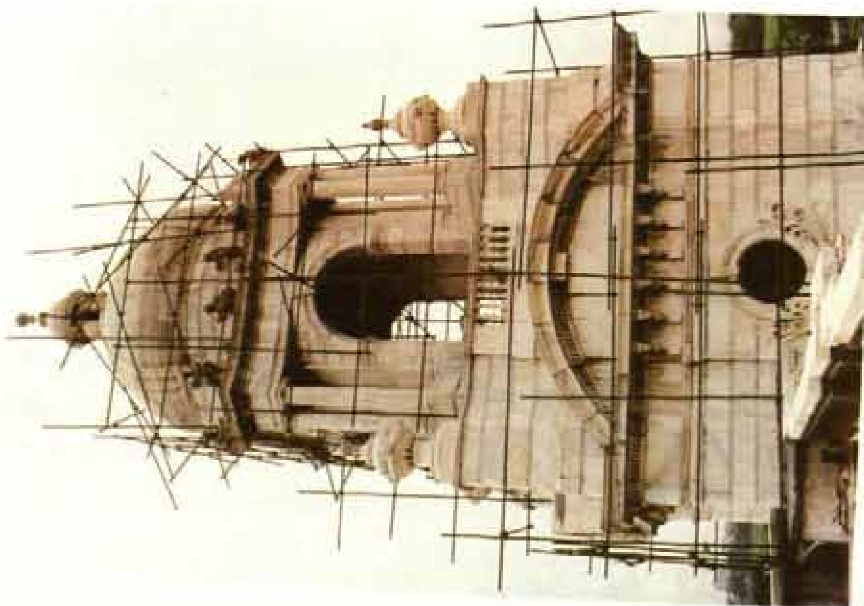
295. TWIN TEMPLES, BAIDYAPUR, DISTRICT BARDDHAMAN

Necessary underpinning work by brick on the

Plates 200-201



201



200

Victoria Memorial Hall, Kolkata: 200, *during* and 201, *after conservation*

sikharas of the temple were done after removing the deep rooted trees. Recess pointing on brick joints of the wall and watertightening of two temples were also done.

296. TEMPLE OF ICHHAI GHOSH, GOURANGAPUR DISTRICT BARDDHAMAN

Damaged *sikhara* of the temple was mended by core filling work. Decorative brickwork on the *pagas* with necessary core filling work on all sides were completed in addition to recess pointing on brick joints.

297. HAMSESVARI TEMPLE, BANSBERIA, DISTRICT HUGLI

The relaying of damaged roof as per original and fixing a damaged turn-style gate after necessary repairing were done.

298. DUTCH CEMETERY, CHIINCHURA, DISTRICT HUGLI

Completed the work of repairing the coping of the boundary wall besides plastering the eastern and southern sides of the cemetery. Decorative plastering on a big tomb inside the cemetery was completed.

299. MOSQUE AND DARGAH OF ZAFAR KHAN GAZI, TRIBENI, DISTRICT HUGLI

Brickwork and plastering of damaged tombs inside the protected area was completed along with the plastering of boundary wall on southern side and relaying of lime-concrete pathway around the Dargah. Missing brickwork of the northwestern corner of the mosque was attended to.

300. KOCH BIHAR PALACE, KOCH BIHAR, DISTRICT KOCH BIHAR

Brick apron was provided on the frontal, western and northern sides of the palace. The worn-out plaster of some of the rooms of the floor was removed before replastering. The work of white washing and painting in different rooms of the first floor on northern and southern sides was also done.

301. METCALFE HALL, KOLKATA

Damaged lime terracing of the roof was dismantled and relaid. Relaying of marble flooring and polishing of marble flooring was done. To retain the original look, the wooden door was polished in the first floor.

302. VICTORIA MEMORIAL HALL, KOLKATA (UNDER CIVIL DEPOSIT WORK)

Filling of the marble joints on the outer surface of the southwestern tower was done. The work of pointing of marble joints of the exterior wall and watertightening the skylights of the dome was completed, apart from spreading of gravels on the pathway along with relaying of chequered tiles on the footpath on all the sides (pls. 200-201).

303. CHAMKATTI MASJID, GOUR, DISTRICT, MALDAH

In the upper portion of the northern and southwestern sides, after removing the dead mortar and saline affected bricks, the area was mended properly.

304. GUMTI GATE, GOUR, DISTRICT MALDAH

Dilapidated wall adjacent to Gumti Gate was restored.

305. KOTWALI DARWAJA, GOUR, DISTRICT MALDAH

The eastern side of the structure was restored to its original position.

306. GROUP OF TEMPLES, PATHRA, DISTRICT MEDINIPUR (UNDER CIVIL DEPOSIT WORK)

The frontal pillars of Navaratna temple were restored following the original ornamental mouldings.

Plates 202-203



202



203

Navaratna Temple, Pathra: 202, before and 203, after conservation

Besides, the ornamental bricks wherever damaged, in all the temples, were repaired. The floor and wall of the temple were also strengthened and repaired (pls. 202-203).

307. TOMB AND MOSQUE OF ALIVARDI KHAN AND SIRAJ-UD-DAULAH, KHOSBAG, DISTRICT MURSHIDABAD

Damaged portion of the brick wall on the northern and southern sides was repaired with lime-*surkhi-mortar* matching the existing original wall.

308. IMAMBARA, MURSHIDABAD DISTRICT MURSHIDABAD

The worn-out *bargahs* from the roof of north-east corner and eastern side of the verandah were replaced by new *bargahs* after mending the damaged portion properly and relaid with lime-concrete.

LUCKNOW CIRCLE

UTTAR PRADESH

309. SRINGAVERAPURA, ALLAHABAD, DISTRICT ALLAHABAD

The work of resetting, pointing and watertightening with combination materials of the damaged retaining walls of the corner of tank B was taken up.

310. TOMB OK BIBI TAMBOLIN, KHUSROBAGH, ALLAHABAD, DISTRICT ALLAHABAD

Replacement of old stones and laying of stone apron (after providing four thick concrete flooring) around the tomb were done.

The decayed and damaged plaster of the dome was taken out for relaying of new lime-plaster as per original. The staircases were also repaired.

311. NEELAKANTA TEMPLE, KALINJAR FORT, BANDA, DISTRICT BANDA

The work of C.R. stone masonry wall and plastering of the walls and *kanguras,* replastering of buldged-out and damaged wall of the back side was undertaken.

312. RANIMAHAL, RANGMAHAL, KALINJAR FORT, BANDA, DISTRICT BANDA

Damaged and decayed parts of wall were restored after taking out the old one and lime-plastered flooring was also laid.

313. JHANSI FORT, JHANSI, DISTRICT JHANSI

The dead and decayed lime-concrete was removed for relaying a fresh lime-concrete on top of the roof of walls of Gulam Gaus Khan.

314. JAINA TEMPLE, CHANDPUR, LALITPUR, DISTRICT LALITPU R

The work of providing flagstone apron around the temple was done.

315. DASAVATARA TEMPLE, DEOGARH, LALITPUR, DISTRICT LALITPUR

The boundary wall with stone masonry around the temple was provided.

316. ALAMBAGH CEMETERY, LI (KNOW, DISTRICT LUCKNOW

The pathway from the entrance to the memorial pillar was relaid with stones.

317. AMJAD AI I SHAH'S MAUSOLEUM, LUCKNOW, DISTRICT LUCKNOW

318. The work of richly-carved plaster with floral design on the central facade of the mausoleum was completed. The front verandah and adjoining steps were repaired. The restoration work of eastern facade is in progress.

318.ASAF-UD-DAULA'S IMAMBARA/BARA IMAMBARA, LUCKNOW, DISTRICT LUCKNOW

The work of reconstruction of fallen stone *chhatris* of the three corners (except south-west corner) and replacement of dead lime-concrete on the roof terrace of the second main gateway were completed. The dead lime-concrete of the rear court was replaced and the moulded plaster and ornamental designs were executed matching the original.

Restoration of richly moulded and ornamental work, moulded-plaster, miniature domes, arches, piers, cornices, ceilings and replacement of dead lime-concrete were done in the rear roof terrace of Shah-n-Sheen of Bara Imambara.

319. BARGAWAN CEMETERY, LUCKNOW, DISTRICT LUCKNOW

A boundary wall along with railing was constructed around the protected area.

320. BEGUM KOTHI, RESIDENCY, LUCKNOW, DISTRICT LUCKNOW

The underpinning, edging, watertightening, flooring, plastering were done wherever necessary, as per original.

321. BIBIAPUR HOUSE, LUCKNOW, DISTRICT LUCKNOW

The eastern hall of the Bibiapur House was pointed.

322. CEMETERY NEAR FORT, MACHCHI BHAVAN LUCKNOW DISTRICT LUCKNOW

Construction of ornamental boundary wall towards the north (with *lime-surkhi)* was undertaken and completed. Towards the south and east simple boundary wall was raised upon the old existing wall and plastered the same. Cenotaphs of five graves were restored as per original.

323. CEMETERIES, DILKUSHA, LUCKNOW, DISTRICT LUCKNOW

Simple moulded-plaster work on the compound wall of the cemetery was attended to besides providing lime-concrete flooring in the second cemetery with proper drains.

324. DILKUSHA PALACE, LUCKNOW, DISTRICT LUCKNOW

Ornamented compound wall facing south, south-east and south-west was constructed. The underpinning, plastering etc., were done in the eastern facade of the north-east building. The repairs to the ornamental and floral designs of the stucco work were attended to.

325. KHUSHID ZADI/MUSHEERZADI'S TOMB, LUCKNOW, DISTRICT LUCKNOW

The work of fixing of small sized iron grill in the second floor was completed.

326. MEMORIAL PILLAR, MOHIBULLAHPUR, LUCKNOW, DISTRICT LUCKNOW

Construction of boundary wall was completed.

327. NADAN MAHAL, LUCKNOW, DISTRICT LUCKNOW

Replacement of *chhajja* stone in Solah Khamba was attended to as per original.

328. SIKANDERBAGH, GATE, LUCKNOW, DISTRICT LUCKNOW

Construction work of ancient wall (adjoining N.B.R.I.) with the help of *lakhauri* brick was completed.

329. TOMBS OK SHAHNA.IAF AND GHAZI-UD-DIN-HAIDER, LUCKNOW, DISTRICT LUC KNOW

The work of restoration of fallen canopy in

the north-east with the help of *lakhauri* brick and lime-concrete was completed matching with the original.

330. TEMPLE:, KIRAT SAGAR, MAHOBA, DISTRICT MAHOBA

The work of structural repairs to the main temple by providing C.R. stone masonry around the platform and flush pointing were done wherever required as per original. Lime-plastering work in small temples were completed besides repairing of Ghats.

331. TEMPLE AND GHATS, SIJARI, MAHOBA, DISTRICT MAHOBA

The work of dismantling of old, dead lime-plaster and ruined stone work, lime-plastering of the *garbhagriha* and providing a boundary wall were attended to.

MINI CIRCLE

GOA

332. AGUADA FORTRESS (UPPER), CANDOLIM, DISTRICT NORTH GOA

The fortification wall towards north-west and moat towards the south were pointed with combination mortar and cavities in the bedrock upon which the wall were raised, filled up with cement-concrete.

333. FORTIFICATION WALL, AGIADA FORTRESS (LOWER), CANDOLIM, DISTRICT NORTH GOA

The 18.00 m long collapsed breach was constructed with laterite stone masonry and supported with buttress wall (pls. 206-207).

334. BASILICA OF BOM JESUS, OLD GOA, DISTRICT NORTH GOA

The damaged Cuddapah stone floor of quadrangle cloister was repaired by laying new Cuddapah slabs matching the original. The wall paints which were peeled off at many places inside the Basilica were applied with oil bound distemper, acrylic emulsion and exterior walls with cement paint (snowcem).

335. CHURCH OF LADY OF ROSARY, OLD GOA, DISTRICT NORTH GOA

The floor of bell tower was repaired by laying CC 1:3:6 and then plastered over it. The bell tower staircase steps, badly damaged and missing, were replaced with RCC steps. The bell tower roof which was leaking due to damaged wooden beams and sunken was repaired by replacing decayed wood with fresh *matti* wood.

336. CHURCH AND CONVENT OF ST. FRANCIS OF ASSISI, OLD GOA, DISTRICT NORTH GOA

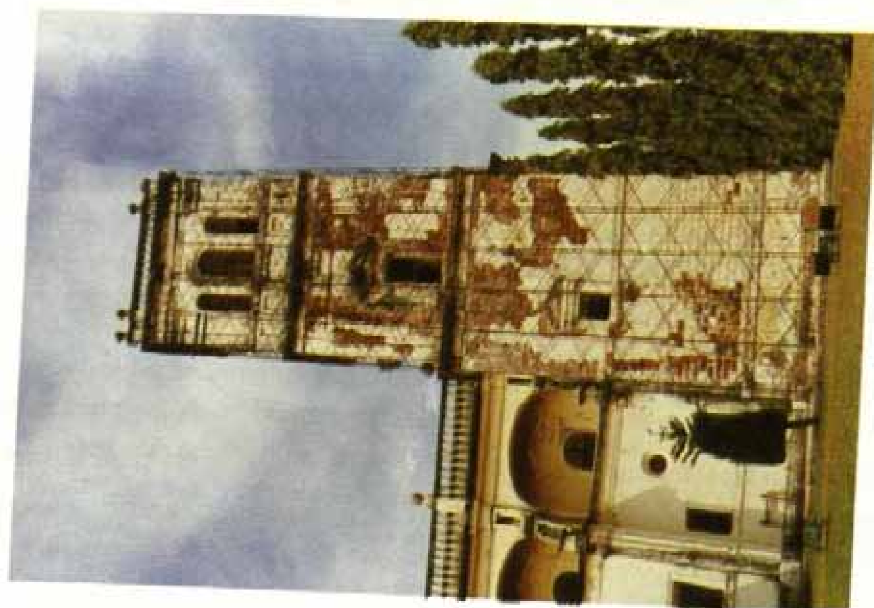
Both the side aisles of the church were provided with tiled roof by replacing decayed wooden beams, rafters and battens. After dismantling the ceiling of rooms behind the main altar which was completely damaged and sagged due to percolation of rainwater, it was made presentable by relaying with fresh *matti* wood. The panel paintings of choir portion were strengthened by providing marine plywood and a coat of wood preservatives and fixed in their respective places. The rooms behind the main altar were deplastered and replastered with lime, sand-mortar and then white washed.

The gutters and pipes were rearranged after welding the joints of the gutters and providing proper slope to drain off the rain-water. The walls of lobby were deplastered and replastered with lime-sand-mortar.

337. CHAPEL OF ST. CAJETAN, OLD GOA, DISTRICT NORTH GOA

The damaged walls and stairs of bell tower

Plates 204-205



204



205

Se Cathedral, Goa: 204, *before* and 205, *after conservation*

Plates 206-207



206



207

Aguada Fortress (lower), Candolim: breach to fortification, 206, before and 207, after conservation

were deplastered and replastered with lime-sand-mortar. The pillars with floral designs were deplastered and replastered with lime and sand-mortar. The decayed portion of side doors was repaired by using fresh teakwood with similar design.

338. CHAPEL 01 Si. CATHERINE, OLD GOA, DISTRICT NORTH GOA

The roof which was damaged entirely, was repaired by replacing decayed beams, rafters and battens. The decayed windows were replaced with new ones. The side doors which were decayed at bottom were repaired with fresh wood matching the available design.

339. SE'CATHEDRAL, OLD GOA, DISTRICT NORTH GOA

The damaged plaster of bell tower (pls. 204-205) walls and facade was deplastered and replastered in combination with lime and sand-mortar followed by waterproof cement paint. The roof of sacristy which was damaged and sunken was repaired by replacing wooden members.

The Campus was electrified by providing sodium Vapours at four places. The Aluminum cable which was not in use for dome light was replaced with copper cable and made in use.

340. SAFA MASJID, PONDA, DISTRICT NORTH GOA

The floor and steps leading to tank cells were pointed in cement-mortar mixed with matching colour. The two coats of paint were applied for both interior and exterior walls. The roof was also repaired. The barbed-wire fencing found damaged at places, was repaired.

341. MAHADEV-V TEMPLE, TAMBDISURLA, DISTRICT SOUTH GOA

The approach road was laid by pitching river pebbles in cement-mortar from the gate to the temple

PATNA CIRCLE



342. EXCAVATED REMAINS, VIKRAMSHILA MONASTERY, ANTICHAK, DISTRICT BHAGALPUR

Walls of lower and upper terraces of main stupa facing north were consolidated by pointing in recess and watertightening the top three courses using lime-*surkhi-mortar* and special size bricks with original geometrical pattern and carvings. The damaged and decayed floor was also replaced with fresh lime-concrete.

343. ANCIENT SITE, KURKIHAR, DISTRICT GAYA

Protected area was fenced with barbed-wire to avoid trespass and encroachment.

344. EXCAVATED REMAINS, KOLHUA, DISTRICT MUZAFFARPUR

Recently excavated structure in-between *svastika-shaped* monastery and the tank was consolidated by resetting, pointing and water-tightening. Eastern boundary of the site was fenced by a dwarf wall with M.S. grill over it.

345. EXCAVATED REMAINS, NALANDA, DISTRICT NALANDA

Consolidation of decayed portions in Temple 3 and Monasteries 1 to 4 attended to by way of pointing, underpinning, resetting and watertightening the top three courses with lime-*surkhi* mortar and special size bricks. Pathways were provided with bricks on edge for movement of visitors. Votive stupas between Temples 3 and 12 were conserved and watertightened. The damaged and decayed concrete floor was also replaced with fresh lime-concrete.

346. ANCIENT SITE, RAJGIR, DISTRICT NALANDA

Jarashandh-ka-Akhara was conserved and consolidated by restoration of damaged portion. Ajatashatru Stupa at Rajgir was also consolidated by pointing in recess. Flight of steps at Maniyar Matha was repaired with special size bricks and lime-*surkhi-mortar.* Top courses of structure at Maniyar Matha were watertightened. The fencing by a boundary wall with M.S. grill over it was provided to the recently excavated brick stupa.

347. EXCAVATED REMAINS, KUMRAHAR, DISTRICT PATNA

In order to check tresspassing, a high boundary wall with barbed-wire fencing over it was provided on the southern side of the excavated remains.

348. GRAHAM'S HOUSE, BANKIPUR, PATNA, DISTRICT PATNA

Repair work was done in the upper story of the building. In addition to the removal and replastering of weak plaster of the wall, decayed parts of doors and windows and wooden flight of steps were repaired matching with the original. Steps, beams, doors, windows and the wall were also painted with suitable colours.

349. HASAN SHAH SUM'S TOMB, SASARAM, DISTRICT ROHTAS

Kiosks of the tomb were plastered with lime-*surkhi* mortar in accordance with the original after removing the old decayed chunks of plaster. Pathway and verandah around the tomb were paved with stone slabs for easy movement of visitors.

350. SHER SHAH SUM'S TOMB, SASARAM, DISTRICT ROHTAS

The *ghat* at the south-east corner of the great tank was restored by matching ashlar stone masonry. The catchment drain was also repaired and covered with stone slabs. The area around the main tomb was paved with stone slab in accordance with the original to check the percolation of rain-water into the foundation of the tomb.

351. ANCESTRAL HOUSE OK DR. RAJENDRA PRASAD, JIRADEI, DISTRICT SWAN

The damaged and missing portion of rooms at first floor of the residential-complex was repaired and restored as per original. Repair work of the doors and windows in the Baithak portion of the complex was attended to. The inside and outside wall and the door, windows, beams and batterns, were painted with suitable colours.

UTTAR PRADESH

352. OLD FORT, JAUNPUR, DISTRICT JAUNPUR

A portion of fallen fortification wall on the eastern arm was restored by using ashlar stone masonry on the outer face and brickwork on the inner face. The core was filled up with coursed rubbles in accordance with the original.

353. RAMABHAR STUPA, KI SHINAGAR, DISTRICT KUSHINAGAR

In continuation of the previous year's work *(1998-1999,* p. 311), the consolidation of structures near the main stupa was done by resetting, pointing and watertightening. Apron around the main stupa was provided to check percolation of rain-water into the foundation.

354. EXCAVATED REMAINS, KI SHINAGAR, DISTRICT KUSHINAGAR

Monastery-complex and votive stupas around

the Nirvana Temple were consolidated by underpinning, pointing and watertightening of top courses.

355. JAI SINGH'S OBSERVATORY, MAN MAHAL, VARANASI, DISTRICT VARANASI

Entrance gate towards the Dasasvamedha Ghat was widened for the convenience of visitors. Southwest corner of the roof of the main hall was opened and recasted to arrest the seepage of water. Three decayed wooden beams were replaced by new one skillfully without disturbing or damaging the instruments of the observatory on the top. Rotten doors and windows of the palace were replaced matching with the original. Walls, beams, doors and windows were painted in suitable colours. The courtyard was paved with stone slabs.

356. CHOUKHANDI STUPA, SARNATH, DISTRICT VARANASI

In continuation of the previous year's work *{1998-1999,* p. 311), the restoration of northeastern part of the lower terrace of the stupa was taken up with special size brick and lime *surkhi* mortar as per original.

357. EXCAVATED REMAINS, SARNATH, DISTRICT VARANASI

Resetting, pointing and watertightening of the votive stupas and other structures near Mulagandhakuti was done in addition to the construction of boundary wall with brick and grill fencing for preventing trespassing.

SRINAGAR CIRCLE

JAMMU AND KASHMIR

358. MUGHAL. ARCADE, VERINAG, DISTRICT ANANTNAG

Lime-concrete was laid to watertighten the roof after dismantling the old and dead concrete. Stone *chhajja* and brackets were fixed in accordance with the original pattern. Besides, M.S. railing was fixed around the spring.

359. SIVA TEMPLE, FATEHGARH, DISTRICT BARAMULLA

Chain link fencing over masonry wall was provided in order to enclose the protected area of the monument.

360. FORT, AKHNUR, DISTRICT JAMMU

Old and buried structures were exposed on the western side of Sheeshmahal by way of scientific clearance. Structural repairs to the fortification wall by way of brick masonry and pointing with combination mortar were carried out.

361. ALCHI MONASTERY, ALCHI, DISTRICT LEH

Lime-concrete apron was provided around the Guru Chorten in order to stop seepage of water in foundation.

362. HEMIS MONASTERY, HEMIS, DISTRICT LEH

Old and decayed wooden members of the roof such as poplar polesand twigs were replaced by new ones and the damaged walls of mud-brick masonry were repaired following the original pattern. A coat of mud-plaster similar to the original was also applied (pls. 208-209).

363. MONASTERY, LAMAYURU, DISTRICT LEH

Buttress wall was provided in order to safeguard the overhanging structure from being damaged (pls. 210-211).

364. LEH PALACE, LEH, DISTRICT LEH

Structural repairs by way of random rubble

Plates 208-209



208



209

Ladakh, Hemis Monastery: 208, *before* and 209, *after conservation*

Plates 210-211



210



211

Ladakh, Monastery of Lamayuru: 210, *before* and 211, *after conservation of buttress wall*

Plates 212-213



212



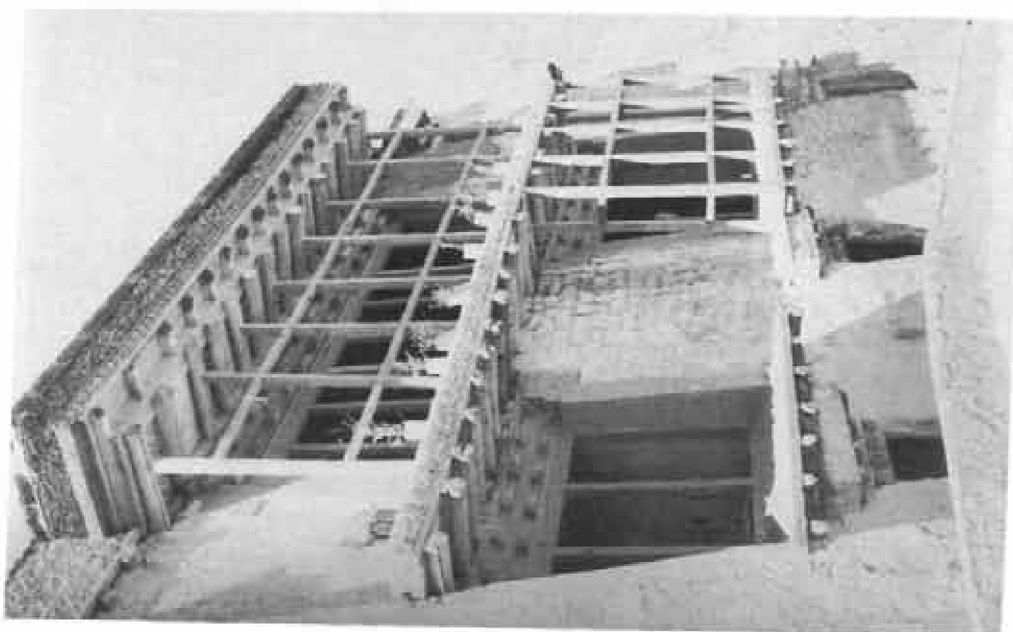
213

Ladakh, Shey Palace: 212, *before* and 213, *after conservation*

Plates 214-215



214



215

Ladakh, Thiksey Monastery: 214, *before* and 215, *after conservation*

Plates 216-217



216



217

Ladakh, Stupa at Tisseru: 216, *before* and 217, *after conservation*

Plates 218-219



219



218

Srinagar, Akhun Mulla Shah Mosque: 218, *before* and 219, *after conservation*

stone masonry and pointing were carried out to the southwestern side in consonance with the original pattern.

365. PHYANG MONASTERY, PHYANG;, DISTRICT LEH

Structural repairs by way of laying mud-concrete and plastering were carried out in order to watertighten the roof strictly in conformity with the original pattern.

366. SHEY, PALACE, SHEY, DISTRICT LEH

Old and decayed wooden members of the roof such as poplar poles and twigs were replaced by new ones at different levels following the original pattern (pls. 212-213).

367. THIKSEY MONASTERY, THIKSEY, DISTRICT LEH

Old and decayed wooden members of the roofs such as poplar poles and twigs were replaced by new ones following the original pattern (pls. 214-215).

368. STUPA AT TISSERU, DISTRICT LEH

The work of dry brick masonry and plastering with mud-mortar was carried out following the original pattern (pls. 216-217).

369. AVANTISVARA TEMPLE, AVANTIPUR, DISTRICT PULWAMA

Chain link fencing over dwarf wall was provided in order to enclose the protected area of the monument.

370. SIVA TEMPLE, LADUV, DISTRICT PULWAMA

Chain link fencing over dwarf wall was provided around the monument in order to enclose the protected area.

371. AKHUN MULLA SHAH MOSQUE, SRINAGAR, DISTRICT SRINAGAR

Underpinning of rubble stone masonry with combination mortar was carried out besides grouting wide and deep cracks and pointing of joint of rubble stone masonry (pls. 218-219).

372. TOMB OF ZAIN-UL-ABIDIN'S MOTHER , SRINAGAR, DISTRICT SRINAGAR

Joints of rubble stone masonry and *lakhauri* brick masonry were pointed with combination mortar. Besides lime-concrete coping was provided over the enclosure wall strictly in accordance with the original pattern.

373. PARIMAHAL, SRINAGAR, DISTRICT SRINAGAR

Exterior portion of wall at the main entrance gate of the monument was plastered with lime-mortar in conformity with the original pattern.

374. GROUP OF TEMPLES, KIRAMCHI, DISTRICT UDHAMPUR

Structural repairs by way of course rubble masonry, plastering and pointing with combination mortar were attended to.

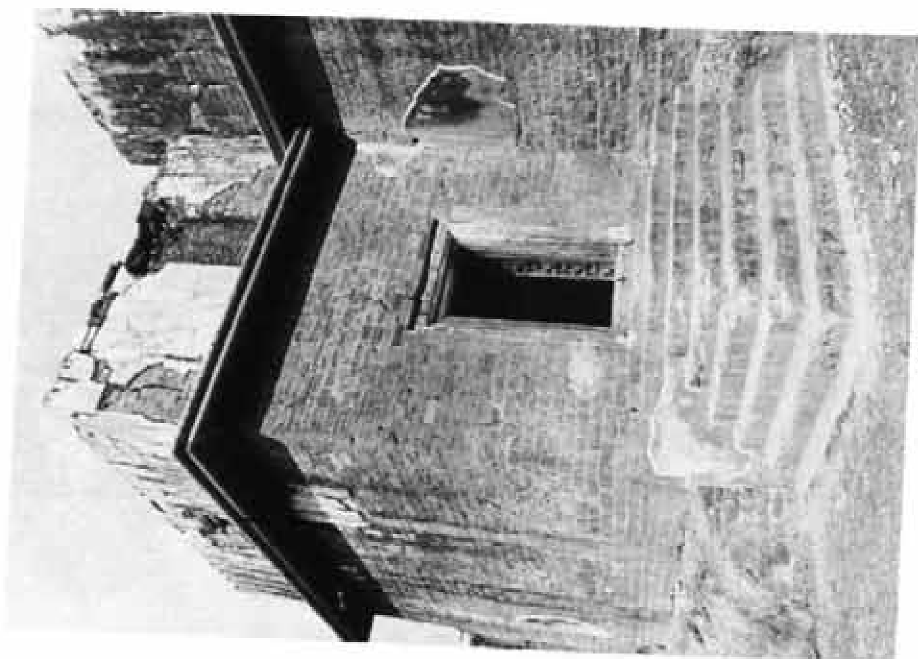
375. DERA, TEMPLE, MANWAL, DISTRICT UDHAMPUR

Chain link fencing over dwarf wall was provided in order to enclose the protected area of the monument.

376.DEVI BHAGAVATI TEMPLE, MANWAL, DISTRICT UDHAMPUR

Chain link fencing over stone masonry wall was provided in order to enclose the protected area of the monument and Devri stone flooring was also laid with a bed of concrete.

Plates 220-221



220



221

Udhampur, Old Palace at Ramnagar: 220, *before* and 221, *after conservation of entrance*

377. KALA DERA II TEMPLE, MANWAL, DISTRICT, UDHAMPUR

Structural repairs by way of ashlar stone-masonry and pointing with combination mortar were carried out following the original pattern in addition to a stone flooring pavement, provided around the temple.

378. NAWA MAHAL, RAMNAGAR, DISTRICT UDHAMPUR

Old and decayed wooden beams, scantlings and planks were replaced with new ones as per original pattern. Besides lime-concrete on the terrace, nibble stone masonry and pointing with combination mortar were also carried out.

379. OLD PALACE, RAMNAGAR, DISTRICT UDHAMPUR

Underpinning of course rubble masonry, *lukhauri* brick masonry and pointing with combination mortar were carried out. Besides old and decayed wooden members of the roof were also replaced by new ones matching the original pattern (pls. 220-221).

380. SAMADHI RAMNAGAR, DISTRICT UDHAMPUR

Course rubble masonry in combinatron mortar was done and stone pathways around the temple were paved following the original pattern. Walls at entrance gate were plastered in combination mortar. Ornamental work and floral designs were reproduced strictly in consonance with the original pattern.

381. SHEESH MAHAL, RAMNAGAR, DISTRICT UDHAMPUR

The work of structural repairs by way of course rubble masonry and plastering in combination mortar was undertaken. Ornamental work and floral designs were reproduced following the original pattern besides providing wooden doors and windows (pis. 222-223).

THRISSUR CIRCLE

KERALA

382. MATTANCHERRY PALACE, KOCHI, DISTRICT ERNAKULAM

The wooden beams of the coronal ion hall were replaced by new teakwood beams and planks

383. FORT, ST. ANJELO, DISTRICT KANNUR

The double-vaulted roof of the horse stable was taken up for conservation. Dead weigh! over I he arched-roof was removed and the original double-vaulted roof was exposed. The appex of the arches stitched and grouted wherever the huge cracks were seen and watertightened with *surkhi* and hand ground lime-mortar. The inner and outer ceilings were plastered as per the original. By removing the dead weight and restoring the original shape, (he leakage-inside and dampness over the wall and roof 'etc. were completely arrested.

384. TELLICHERY FORT, TELLICHERY, DISTRICT KANNUR

The old British period tiled roof building was conserved by replacing the rotten leak wood rafters as also by providing the new wall plate I lie accretion of petroleum tar inside the fort were removed and the work of laying out lawn was started

385. BEKAL FORT, PALLIKKARE, DISTRICT KASARGOD

The access pathway to the western side sea bastion was conserved by exposing the original steps

Plates 222-223



222



223

Udhampur, Sheesh Mahal, Ramnagar: 222, *before* and 223, *after conservation*

The missing laterite blocks were replaced and the original steps were restored. The watchtower of the fort was provided with coping wall as per the original. The well adjacent to the watchtower was exposed and the original steps were also exposed. A parapet wall was provided around the stepped-well to prevent any untoward incident.

386. PALAKKAD FORT, PALAKKAD, DISTRICT PALAKKAD

The accretionary wall on the eastern side of the moat of the fort were removed and the original drainage was restored. The main gateway to the fort were repaired by exposing the original floor level of the gateway.

387. SIVA TEMPLE, NETRUMANGALAM, PATTAMBI, DISTRICT PALAKKAD

The *prakara* wall on the southern and eastern side were reconstructed as per the original.

388. SIVA TEMPLE, CHEMMANTHITTA, DISTRICT THRISSUR

The out-of-plumb *prakara* wall was reset after removing the heavy vegetational growth. The disintegrated laterite stones, missing stones etc. were replaced and the original shape *(gqjaprishtha)* was restored.

389. VISHNU TEMPLE, KADAVALLUR DISTRICT THRISSUR

Repairs to the western *gopura* were carried out by replacing the rotten teak wood beams with fresh new teakwood of same nature.

390. SIVA TEMPLE, PALLIMANAMHM, DISTRICT THRISSUR

Repairs to the roof of the Srikovil was taken up by replacing the rotten wooden members with new teakwood members.

391.TENKAILASANATHA TEMPLE, THRISSUR, DISTRICT THRISSUR

The decayed and damaged wooden pillars, beams, rafters and ceiling of the top two tiers of the southern *gopura* were replaced with new teakwood members. Tiles were relaid over the roof as per the original.

392. FORT, ANJENGO, DISTRICT THIRUVANANTHAPURAM

To prevent encroachment, a dwarf wall with fencing was provided all around the monument.

393. JAINA TEMPLE, KIDANGANAD, SULTAN BATHERY, DISTRICT WAYANAD

The plinth of the main shrine which was found sunken were reset with available architectural members scattered in the premises.

TAMIL NADU

394. BHAGAVATI TEMPLE, CHITRAL, DISTRICT KANYAKUMARI

The Vimana *(sa/a-sikhara)* over the sanctum of the Bhagavati Temple. Chitral was repaired by underpinning the bricks, grouting, filleting etc. The original mouldings of the Vimana were restored by lime-plaster.

395. PARTHASARATHI AND KRISHNA TEMPLE, PARTHIVAPURAM, DISIRICT KANYAKUMARI

Repairs to the roof to the Sastha Temple were taken up by removing rotten rafters. The western cloistered-mandapa was conserved by replacing rotten beams and rafters. Wherever necessary, the tiles were replaced as per the original.

Plates 224-225



224



225

Diu, Fort and inside buildings: 224, before and 225, during conservation

396. ROCK-CUT CAVE TEMPLE, THIRUNANDIKARA DISTRICT KANYAKUMARI

Around the monument a barbed-wire fencing was provided to prevent encroachments.

397. VALISVARA TEMPLE, THIRUVALISVARAM DISTRICT KANYAKUMARI

The front *mandapa* was conserved by removing the dead weight. The work of removing the disintegrated weathering course, resetting of the out-of-plumb pillar by replacing the broken beam and capital and watertightening the roof of the *mandapa* were undertaken.

398. FORT AT VATTAKOTTAI, DISTRICT KANYAKUMARI

The coping wall over the northern wall of the fort was repaired by underpinning and grouting the cracks. Lime-plaster was applied as per the original over the brick coping wall.

VADODARA CIRCLE

DAMAN AND DIU

399. THE CHAPEL OF OUR LADY OF ROSARIO, MOTI DAMAN, DAMAN

In continuation of the last year's work *(1998-99,* p. 320), the deteriorated and damaged decorative wooden ceiling over the prayer hall (Nave) was dismantled after documentation. The entire Nave ceiling was prepared with new Bulsar country teakwood with decoration and mouldings as per original and fixed in position. The damaged and decayed wooden ceiling along with lime-concrete roof top of entrance porch was dismantled and replaced with new Bulsar country teakwood with decoration and mouldings as per original. Tin's work is in progress.

400. RUINED CHURCH, MOTI DAMAN, DAMAN

Dead and decayed lime-concrete floor of the central square and the open portion west of sanctum were moved and relaid afresh. Wall top of the church was underpinned and watertightened.

401. FORT AND INSIDE BUILDINGS DIU

In continuation of the last year's work *(1998-99,* p. 324), the decayed and worn-out stones of fort wall and heavy stone masonry of culvert near gate and jetty were replaced with new stones of same size including pointing of the joints matching the original in colour and texture (pis. 224-225). The work is in progress.

402. ST.PAUL'S CHURCH, DIU

Old, dead and damaged plaster of walls was removed and replastered with lime-cement mortar matching the original. Interior walls were painted with oil bound distemper in matching colour besides providing stone apron over the base concrete on the rear side of the church. The work is in progress.

GUJARAT

403. BIBIJI'S MASJID, AHMEDABAD, DISTRICT AHMEDABAD

The damaged and decayed stone architectural members such as columns, capitals and lintels of south part of prayer hall of the mosque were replaced with newly dressed stone architectural members, matching the original.

The dislodged and settled northern entrance porch of Muluk Khana or Royal (Gallery with Flight of stairs on the north was dismantled after detailed documentation and reconstructed with original available stone architectural members to plumb. The damaged, decayed and missing stone architectural

Plates 226-228



226



227



228

Champaner, Jami Masjid, eastern wall: 226, before; 227 during and 228, after conservation

members such as pillars, capitals and lintel etc. were also replaced with newly dressed stones. The decayed veneering stones of the walls were also replaced with Dhrangadhra ashlar stones.

404. ANCIENT SITE, LOTHAL, DISTRICT AHMEDABAD

The bulged burnt brick masonry walls of excavated dockyard was dismantled and reconstructed with burnt brick masonry and joints pointed neatly. The cavities were underpinned. The work is in progress.

405. JAMI MASJID, MANDAL, DISTRICT AHMEDABAD

In continuation of the last year's work *(1998-99,* p. 325), the broken and decayed stone pillars, lintels and roof slabs of Muluk Khana of prayer hall were replaced with new ones after carving them as per original. The work is in progress.

406. MANSAR TALAV AND SHRINES, VIRAMGAM, DISTRICT AHMEDABAD

In continuation of the last year's work *(1998-99,* p. 325), the decayed and dislodged steps, paved embankment along with miniature shrines and the retaining wall on back were carefully dismantled after proper documentation and restored in proper alignment. The decayed, damaged and missing stone members were replaced with new-matching Dhrangadhra stones. The missing stone architectural members of miniature shrines such as door-sills, door-jambs etc. were also provided with new members in matching the original. The work is in progress.

407. PANCH MAHUDA-KI-MASJID, HALOL, DISTRICT GODHRA

In continuation of the last year's work *(1998-99,* p. 326), the damaged and missing portions of the adjoining tomb were restored with Dhrangadhra stone ashlar masonry after carving them as per original.

408. MANDVI OR CUSTOM HOUSE, CHAMPANER, DISTRICT GODHRA

In continuation of the last year's work *(1998-99,* p. 326) the restored ashlar stone masonry wall and stone arches were covered with stone slabs and the top was sealed with a layer of lime-concrete to arrest water seepage.

409. JAMI MASJID, CHAMPANER, DISTRICT GODHRA

In continuation of the last year's work *(1998-99,* pp. 325-326), restoration of missing stone pilasters, *chhajjas,* etc., of windows near eastern entrance porch of the mosque, with fresh ones after carving them as per original is in progress (pls. 226-228).

410. LAKULISA TEMPLE, PAVAGADH, DISIRICT GODHRA

In continuation of the last year's work *(1998-99,* p. 326), the temple was provided with dressed stone paved apron on concrete base. The work is in progress.

411. TEMPLE OF RAM-LAXMAN, BARADIA, DISTRICT JAMNAGAR

Replacement of decayed, damaged and missing stone members of plinth of the temple with fresh limestones was taken up. The work is in progress.

412. DHARASHNVEL TEMPLE (MAGDERU), DISTRICT JAMNAGAR

Damaged and bulged-out sub-shrine on south-east side was dismantled carefully after proper documentation and reconstructed with original available stone architectural members to plumb. Damaged and missing stone architectural members were replaced with new dressed Bardia limestone with moulding and carving matching the original. The work is in progress.

413. DWARKADHISH TEMPLE-CO.MPLEX, DWARKA, DISTRICT JAM.NAGAR

In continuation of the last year's work *(1998-99,* p. 326), the walls of Mokshadwar were restored in limestone ashlar masonry as per original. The damaged and cracked stone architectural member such as capitals, lintels, brackets and roof slabs, etc. were replaced with limestone with moulding and carving matching the original. Roof terrace was made watertight by laying a layer of lime-concrete afresh. The decayed and damaged stone pavement was partly provided with chisel-dressed Bardia limestone. The work is in progress.

414. RUKMANI TEMPLE, DWARKA, DISTRICT JAMNAGAR

In continuation of the last year's work *(1998-99,* p. 326), the dismantled rubble stone masonry compound wall and ashlar stone masonry pillars were reconstructed as per original. New wooden gate was provided in place of old missing gate.

415. GOKESHVARA MAHADEVA TEMPLE, LOWRALI, DISTRICT JAMNAGAR

Reconstruction of random rubble stone masonry compound wall with coursed rubble stone masonry pillars was taken up for safety and security of the temple and to prevent encroachments. The work is in progress.

416. *GOP* (SUN) TEMPLE, NAM GOP, DISTRICT JAMNAGAR

The loose ashlar stone masonry of the temple was taken out and reset in their original position. GI barbed-wire fencing was repaired.

417. KANKESHVARA MAHADEVA TEMPLE AND OTHER SHRINES, VASAI, DISTRICT JAMNAGAR

The dismantling of old damaged and worn-out stone flooring of approach path was taken up for reconstruction with new stone flooring as per original. The work is in progress.

418. JUNAGADHI (JAINA) TEMPLE, VASAI, DISTRICT JAMNAGAR

In continuation of the last year's work *(1998-99,* p. 326), the damaged and bulged-out pillars, capitals, lintels, domes and roof-slab of north side corridors were dismantled and reconstructed in plumb and alignment by replacing the decayed, architectural members with the new ones. Besides, the damaged, decayed and missing stone architectural members such as *kumbhis* pillars, capitals, lintels and roof-slab were replaced with fresh fine chisel dressed Bardia limestone architectural members with moulding and carvings matching the original. The roof terrace was watertightened by laying a layer of lime-concrete.

419. ANCIENT-MOUND (EXCAVATED), INTWA, DISTRICT JUNAGADH

Accumulated debris from the excavated site was removed. Excavated brick structures were strengthened and consolidated. The work is in progress.

420. RAO LAKHA CHHATRI, BHUJ, DISTRICT KACHCHH

The step-well adjoining the *chhatris* was taken up for desilting and retrieving of fallen stone architectural members and attended repairs to the flight of stone steps as per original.

421. ANCIENT SITE (KOTADA), DHOLAVIRA, DISTRICT KACHCHH

In continuation of the last year's work *(1998-99,* p. 326), the loose and dislodged rubble stone masonry veneering of eastern wall of citadel was dismantled after proper documentation. The dismantled veneering rubble stone masonry was reset

Plates 229-230



229



230

Surat, Old English Tombs: 229, before and 230, after conservation

in its original position and pointed in lime-mortar mixed with white cement, colour oxide and stone dust, matching the original. The work is in progress.

422. VITHALBHAI HAVELI, VASO, DISTRICT KHEDA

Decayed, damaged and partly collapsed southwestern wing of the *haveli* consisting of ground and first floor was dismantled carefully after proper documentation. Reconstruction was taken up with old serviceable wooden members and decayed, damaged and worn-out wooden members such as pillars, pilasters, capitals, brackets, beams, etc. were replaced with new wooden members with mouldings and carvings as per original.

423. SUN TEMPLE, MODHERA, DISTRICT MEHSANA

Decayed and damaged portion of stone flooring of *nritya-mandapa* was dismantled and relaid with dressed Dhrangadhra stone flooring.

424. LI.MBOJI MA JA TEMPLE, DELMAI, DISTRICT PATAN

The old, decayed and damaged stone flooring of courtyard of the temple was replaced with newly dressed stone flooring as per original. Repairs and restroation of brick masonry compound wall as per original was also taken up.

425. RAM-KI-VAV, PATAN, DISTRICT PATAN

In continuation of the last year's work *(1998-99,* p. 326), the damaged and worn-out stone flooring of 1st and 2nd pavilion of Vav was removed and replaced with fresh Dhrangadhra stone flooring matching the original.

426. SAHASRALINGA TALAO, PATAN, DISTRICT PATAN

The work of desilting of tank and restoration of ashlar stone masonry embankment as per original was taken up and the work is in progress.

427. NILAKANTHESHVARA MAHADEVA TEMPLE, RUHAVI, DISTRICT PATAN

The accumulation of huge debris around the temple was removed to expose basal mouldings of highly ornate plinth and dressed-stone apron on concrete base around the temple was provided. The work is in progress.

428. SIVAIMATA TEMPLE, SUNAK, DISTRICT PATAN

In continuation of the last year's work *(1998-99,* p. 333), random rubble stone masonry retaining wall was constructed along the road side with stone pitching on slope to prevent any damage to the temple due to soil erosion besides providing stone apron around the temple on concrete base.

429. OLD ENGLISH TOMBS, SURAT, DISTRICT SURAT

In continuation of the last year's work *(1998-99,* p. 333), the decayed, peeled of lime-plaster and dead lime-concrete of roof terrace of tomb Nos. 27, 36 and 38 were dismantled and fresh lime-concrete was laid on roof-terrace and watertightened. Lime-plaster was provided to the domes and wall of the tombs including the reproduction of all decorative and floral motifs in plaster as per original (pls. 229-230).

430. HIRA GATE, DABHOI, DISTRICT VADODARA

In continuation of the last year's work *(1998-99,* p. 333), the decayed lime-plaster was removed. The walls and facade of the gate were replastered.

MONUMENTS MAINTAINED BY THE STATES

DELHI

431. BAGHCHI TOMB NEAR HOLE NUMBER 4, DELHI

The Department of Archaeology, Government of National Capital Territory of Delhi, carried out restoration of three *chhatris* made of red sandstone

beside attending to the resetting, plastering, water-tightening of the dome. The damaged decorative floral stucco work was restored and repaired. It also relaid the floor, exposed and restored the plinth of the raised platform of the tomb.

432. CHAUMCHI KHAN'S TOMB, DELHI

The Department of Archaeology, the Government of National Capital Territory of Delhi, conducted the restoration of missing dome and parapet wall of the octagonal wall. Also attended to the work of underpinning, edge and patch plastering, pointing of joints of random nibble masonry, exposing the platform around the tomb. Lime-concerting of flooring inside the tomb was also taken up apart from closing the arched-openings with MS grill.

433. SAYYAD ABID'S TOMB, DELHI

The work of plastering and repairing was done by the Department of Archaeology, the Government of National Capital Territory of Delhi. Also repaired and restored the floral decorated stucco work besides recasting the arches of the Mihrab, lime-plastering tine floor and providing *stone-jalis* in the arched-openings.

434. UNKNOWN TOMB NEAR HOLE NUMBER 14-16 (WITHIN DELHI GOLF COURSE), DELHI

The Department of Archaeology, the Government of National Capital Territory of Delhi, conducted the conservation of outer dome by plastering, watertightening besides lime-concreting the floor and watertightening the roof. The plinth of the tomb was strengthened apart from providing an apron around the tomb.

HARYANA

The Department of Archaeology and Museums, Government of Haryana, carried out conservation at the following monuments under its protection.

435. GEORGE THOMAS KOTHI, HISSAR, DISTRICT HISSAR

Conservation work of three rooms at George Thomas Kothi, locally known as Jahaj Kothi, was completed.

436. CHHATTA RAI BAL MUKAND DASS, NARNAUL, DISTRICT MAHENDERGARH

Some affected areas of the monument were conserved.

437. BHIMA DEVI TEMPLE, PINJORE, DISTRICT PANCHKULA

General clearance work was conducted at the Temple.

MANIPUR

The Department of Archaeology, Government of Manipur, carried out the work of clearing vegetation, moss, lichen and black patches from the roof and walls of the following monuments in District Imphal.

438. TEMPLE OF SHRI GOVINDAJI, KANGLA FORT

439. TEMPLE OF BRINDABANCHANDRA, KANGLA FORT

440. GATE WAY OF MAHARAJA GAMBHIR SINGH, LANGTHAOAL

441. SAMADHI OF MAHARAJA GAMBHIR SINGH, LANGTHAOAL

445. TEMPLE OF LEIMAPOKPA KEIRUNGBA, 3
M.S.R.T.C.

446. SAMADHI OF MAHARAJA KHABA URIPOK

447.TEMPLE OF THANGAL GENERAL, 4
1
WANGKHEI

IX. ARCHAEOLOGICAL CHEMISTRY[1]

TREATMENT OF MONUMENTS AND PAINTINGS

ANDHRA PRADESH

1. SRI VIRABHADRASVAMY TEMPLE, LEPAKSHI, DISTRICT ANANTAPUR

The chemical treatment and preservation of paintings on the ceiling of *ardha-mandapa* and part of *garbhagriha* was carried out during the year. These mural paintings executed on lime ground plaster with granite slab forming the support, had accumulated dust, dirt and soot on the painted surface. At some places, the painted plaster had also lost proper adherence to the support resulting in bulging and also exposing loose edges of the paintings executed on the beams.

The chemical treatment work was initiated by careful removal of superficial dust, dirt and insect nests from the painted surface using sable hair crushes. To fix the bulged areas for proper adherence to the support, these were first given facing with 3-4 layers of soft tissue paper using 5% PVA as an adhesive. Thereafter, 5% PVA solution was injected to the back of the plaster, followed by careful pressing of the bulged area to ensure proper adherence to the support.

Once the bulged out painted plaster was properly secured with desired adherence to the support, the tissue paper applied for facing was slowly removed by applying toluene locally over the surface. The general chemical treatment work was carried out for the removal of dust dirt and soot using a mixture of triethanol amine, non-ionic detergent and one or two drops of ammonia. Thereafter, the surface was cleaned with the mixture of methanol and iso-propanol. At certain locations, the dust particles deeply rooted into the micro cracks of the painted surface which could not be removed were allowed to be in position lest further treatment may result in loss of pigments. Finally 1.5% coat of PVA in toluene was given to the dried painted surface (pls. 231-232).

2. SRI KONDANDARAMASVAMY TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH

The chemical treatment work was framed for the removal of micro-vegetational growth, lime and red ochre coats, oil, turmeric, *kumkum* stains etc. from the exterior of the main temple comprising *natya-mandapa, ardha-mandapa, antarala* and the sanctum-central. In the first step, work was undertaken to remove the dried growth of micro-vegetation by dry brushing. In the next step, mixture of liquid ammonia and non-ionic detergent in 3:1 ratio in aqueous medium was used with mild brushing with thorough washing for the complete removal of micro-vegetational accretionary deposits. The hard tenacious lime, accretionary deposits from the sculptures, pillars, ceiling etc. were removed using 5% acetic acid

[1] Information from : Director (Science) of the Survey, Dehradun



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Sri Virabhadrasvamy Temple, Lepakshi: 231, *before* and 232, *after chemical restoration of the ceiling of arddha-mandapa*

Plates 233-234



233



234

Nayya Mandapa, Sri Kodandaramasvamy Temple, Vontimitta: sculpture on pillar, 233, before and 234, after chemical conservation

solution by chemico-mechanical means. During the period under review only limited area could be chemically treated and preserved, (pls. 233-234).

3. SRI KUMARARAMA BHIMESVARVSVAMY TEMPLE, SAMALKOTA, DISTRICT EAST GODAVARI

During the period under review, the chemical treatment of east and south cloisters of first floor for removal of thick lime-coat and part of exterior of inner *prakara* walls running from north-west corner to the south-east corner for removal of micro-vegetational growth in general and stains of acrylic paints, lime-coats from certain locations was taken up. For the eradication of micro-vegetational growth, a mixture of liquid ammonia and non-ionic detergent solution in 3:1 ratio in aqueous medium was used with mild brushing followed by thorough washing with plain water. The thick and tenacious layers of lime about % of an inch were first mechanically removed and tenacious lime accretions were subjected to chemico-mechanical treatment using dilute acetic acid. The stains of acrylic paints were subjected to local chemical treatment with 5% sodium hydroxide solution followed by washing and neutralisation with 1% solution of acetic acid and again the area was thoroughly washed. The chemically cleaned exterior walls and *chhajjas* were first given fungicidal treatment using 2% coat of sodium pentachlorophenate and finally water repellent coat was applied.

4. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD

In north-west to south-west minarets and the connecting wall, the chemical treatment work initiated during the last year *{1998-99,* p. 338), was continued for the removal of micro-vegetational growth and heavy accumulation of dust and dirt deposited on the lime-plaster. The micro vegetational growth was removed using aqueous ammonia and non-ionic detergent in 3:1 ratio with mild brushing. The cleaned surface was given fungicidal treatment and preserved with double component system using aqueous solution of Repellin super as the first coat followed by a coat of 2-3% PMMA solution in toluene after a gap of fortnight on the dried surface.

In the second step, slurry of bleaching powder was applied and allowed to remain there for 15-20 minutes for complete eradication of micro-vegetational growth from pits and cracks in the lime-plaster. Thereafter the surface was washed using very soft brushes so as to prevent the loss of (sheen of the lime-plaster).

In continuation to the last year's work, the chemical treatment for the removal of accretionary deposits of dust, dirt and micro-vegetational growth from the lime-surface in the north-east and north-west minarets and the connecting wall was carried out using liquor ammonia and non-ionic detergent.

In the second step, slurry of bleaching powder was applied and allowed to remain there for 15-20 minutes for removal of micro-vegetational growth from pits and cracks in lime-plaster. Thereafter, the surface was washed using very soft brushes so as to prevent the loss of sheen of the lime-plaster.

The chemical conservation work in the south-east minaret was also undertaken during the period under review using similar materials and methods as described above.

5. SRI NAVABRAHMASVAMY GROUP OF TEMPLES, ALAMPUR, DISTRICT MAHABOOBNAGAR

The chemical conservation work initiated on the Garuda Brahmesvara and Kumara Brahmesvara Temples forming part of group of nine temples known as Nava Brahma group of temples was continued for

Plates 235-236



235



236

Sri Bhimesvarasvamy Temple, south-west corner: 235, before and 236, after chemical conservation

the removal of lime-wash coats, stains of acrylic paints, red ochre etc. from the interiors of Kumara Brahmesvara Temple and micro-vegetational growth and lime-coats from the exterior surface of both these temples. The work is in still in progress.

6. SRI BHIMESVARASVAMY TEMPLE, SRIMUKHALINGAM, DISTRICT SRIKAKULAM

The chemical conservation work for the eradication of micro-vegetational growth and lime-coats from the exterior and interior of the temple, sitting Nandi sculpture in front of the temple and removal of turmeric, *kumkum,* oil, soot from the loose sculptures housed inside the temple was taken up. The thick growth of moss and lichen on the main Vimana and walls of sanctum and central hall as well as removal of creepers from the joints of stone blocks on the south-west side of Vimana was earned out using mixture of liquid ammonia and non-ionic detergent. The thick deposits of lime accretions were removed using 5% solution of acetic acid by chemico-mechanical means. Some other chemicals like 5% sodium hexametaphosphate, mixture of sodium bicarbonate and bicarbonates were also tried for the removal of calcareous deposits but with little success. The chemically cleaned areas were given fungicidal and water repellent treatment using 2% coats of Gujpol-P (acrylic polymer) in toluene, (pls. 235-236).

7. SRI SOMESVARASVAMY TEMPLE, SRIMUKHA-LINGAM, DISTRICT SRIKAKULAM

During the period under review, the chemical treatment work was continued for the removal of micro-vegetational growth, lime-coat patches, stains of oil, *kumkum* and turmeric etc. Besides, the deposits of bat's excreta from the khondalite stone surface were removed with application of mixture containing little sodium salt of EDTA, liquor ammonia and non-ionic detergent in aqueous medium and brushing. The chemically cleaned areas were given fungicidal treatment followed by application of water repellents using double component system of Repellin super and PMMA in toluene.

ASSAM

8. BISHNUDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR

The plastered-surface of this temple with micro-vegetational growth was observed to be somewhat fragile. Accordingly, during the chemical treatment for .the eradication of micro-biological growth using ammonia and teepol solution, only gentle scrubbing with suitable nylon brushes was carried out. The fungicidal and water repellent treatment was also carried out as described earlier.

9. DEVIDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR

Since this area receives high rainfall, the plastered surface of this temple was observed to be covered with thick layers of moss. The northfacing side, in particular, had thicker growth of micro-vegetation. The chemical cleaning and preservation work were carried out in the similar fashion as described earlier.

10. SIBDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR

The micro-vegetational growth from (he plastered-surface was removed by applying 5% solution of aqueous ammonia and non-ionic detergent and gently brushing. The chemically

given fungicidal treatment and water repellent treatment using double component system to prevent early re-growth of micro-vegetation.

II. BISHNUDOL TEMPLE, JOYSAGAR, DISTRICT SIBSAGAR

The lime-plastered surface of the main temple had thick deposition of moss and lichen giving dull greenish black look to the surface. For the eradication of these biological growths, the chemical treatment was carried out using aqueous solution of ammonia and teepol. The chemically cleaned area was given fungicidal treatment with 5% solution of sodium penta chlorophenate and finally given water repellent coating using double component system with application of Repellin super followed by 2% solution of polymethylmethacrylate in toluene on the completely dried surface.

12. DEVIDOL TEMPLE, JOVSAGAR, DISTRICT SIBSAGAR

This temple having a structure like Bengal Hut was observed to be having profuse growth of micro-vegetation on the top and side walls. The biological growth was eradicated using mixture of 5% solution of aqueous ammonia and 1 % non-ionic detergent by gently brushing the affected plastered surface. The chemically treated area was given fungicidal treatment and surface protection.

13. GHANSHYAM HOUSE, DISTRICT SIBSAGAR

Thick layers of dried micro-vegetation on the plastered surface were removed using 5% aqueous solution of ammonia and 1 % aqueous solution of non-ionic detergent with gentle brushing. To prevent any damage to the fragile lime-plaster, extra care was taken to use only nylon brushes of soft bristles. To prevent the early reccurrence of micro-biological growth and to protect the chemically cleaned plastered-surface, application of 5% solution of sodium pentachlorophenate as fungicide followed by 2% solution of Repellin super was given. After a gap of few days, on the completely dried surface, 2% solution of polymethylmethacrylate in toluene was applied.

14. SHIVDOL TEMPLE, JOVSAGAR, DISTRICT SIBSAGAR

The nature of accretionary deposits was observed to be mainly dried moss and lichen, thereby giving unpleasant appearance to the whole structure. The chemical conservation work was initiated on the similar lines as explained earlier and the work was completed.

BIHAR

15. MONASTERY COMPLEX (NO. 6), NALANDA, DISTRICT NALANDA

The eradication of micro-vegetational growth from the surface of the brick structure and removal of shrubs, which had grown here and there in-between brick layers at different levels, were the main conservation problems. Accordingly, shrubs were removed from the cravices and gaps at these places were filled in. The eradication of micro-vegetational growth from the brick surface was carried out by chemical treatment using aqueous solution of ammonia and teepol. After chemical cleaning, fungicidal treatment was carried out using 5% solution of sodium pentachlorophenate and for the protection of brick surface, 2% solution of Repellin super was initially applied on the entire surface and after a gap

Plates 237-238



237



238

Monastery-complex (6), Nalanda: 237, before and 238, after chemical conservation

of few days 2% solution of polymethylmethacrylate was applied, (pls. 237-238).

DAMAN & DIU

16. CANNONS INSIDE DIU FORT, DIU

The chemical treatment and preservation work on ancient cannons (fifty-six numbers) made of different base metals/alloys, i.e., iron, copper and brass was taken up for the removal of incrustation formed over the surface due to rusting and exposure to vagaries of nature specially saline moist air. The superficial incrustations were removed by chemical treatment using sodium potassium tartrate and then application of petroleum jelly as protective coat was applied on the cleaned surface.

17. SAINT PAUL'S CHURCH, DIU

Two wooden panel paintings of this church were chemically treated for the removal of dust, dirt and old varnish coat from the painted surface using mixture of organic solvents. After chemical cleaning, colour reintegration work was also attended to and finally a protective coat of varnish was applied on the painted surface.

DELHI

I8. DADI POTI TOMB, HAUS KHAS, NEW DELHI

The exterior lime-plastered surface of the dome, its floor area and walls around the dome were chemically treated with mixture of aqueous solution of ammonia and teepol. The chemically cleaned area was subjected to fungicidal treatment followed by application of Repellin super as water repellent.

19. BADA GUMBAD MOSQUE LODI GARDEN, NEW DELHI

In continuation of the last year's *(1999-2000,* p. 343) chemical treatment work, the plastered-surface and floor area were subjected to chemical cleaning process for the removal of dust, dirt and biological accretionary deposits. The fungicidal and water-repellent coatings were also given on the cleaned surface. The work was completed.

20. AZIM KHAN'S TOMB, MEHRAULI, NEW DELHI

The chemical treatment work was undertaken for the removal of superficial accretionary deposits of dust, dirt and dried moss from the plastered-sur-. face of the stone. Besides, the floor area was also taken up for chemical cleaning. The dried layers of moss were subjected to ammonia and teepol treatment using soft nylon brushes and in the next step the plastered-surface was further subjected to bleaching powder treatment in two applications so as to remove the biological accretions without affecting the plastered-surface. The floor area was subjected to ammonia-teepol treatment. The chemically treated area after thorough washing was given fungicidal treatment with sodium pentachlorophenate followed by application of Repellin super as water repellent.

21. QAL'A-I-KUHNA MOSQUE, PURANA QILA, NEW DELHI

The dried moss deposited on the exterior lime-plastered surface of the dome and *kangoorass* facing south wall was initially brushed to remove the loosened layers. Thereafter, the chemical treatment was carried out using mixture of liquor ammonia and teepol. After fungicidal treatment with sodium

pentachlorophenate, the chemically treated surface was given the protective coating using double component system of Repellin super and PMMA in toluene.

22. SHER MANDAL, PURNA QILA, NEW DELHI

The chemical treatment work was undertaken for the cleaning and preservation of the *chhattri* standing on sandstone pillars. The inner side of this sandstone *chhattri* is lime-plastered. The *chhattri* along with its floor area and the octagonal walls was subjected to chemical treatment for the removal of micro-vegetational growth, dust and dirt using ammonia and teepol solution. The entire chemically cleaned surface was given fungicidal treatment and conserved with Repellin super.

23. RED FORT-COMPLEX, RED FORT, DELHI

The chemical treatment work was taken up on the following areas/structures, such as fortification wall beyond Rang Mahal and Khas Mahal, Mussamman Burj; fortification wall - Mumtaz Mahal Museum to Rang Mahal and Rampart wall - Lahori Gate and Delhi Gate

The chemical treatment of sandstone surface involved the removal of dust, dirt and biological accretionary deposits using aqueous solution of ammonia and teepol. Whereas the marble surface of fortification wall from Mumtaz Mahal Museum to Rang Mahal (facing Ring Road) was carried out using clay-pack treatment. The cleaned-surface of sandstone was treated with sodium pentachlorophenate solution as fungicide followed by application of Repellin super as water repellent.

GOA

24. ST. CAJETAN CHURCH, VELHA GOA, GOA

The canvas/panel paintings in this Church in general had suffered significant damage both by insect attack as well as dust, dirt and other accretionary deposits. The chemical conservation work was carried out for the preservation of five panel paintings and one canvas painting. The general conservation measures involved the fixing of the bulged-out or peeled off pigment layer by using hot molten Bees wax and resin mixture; filling up of the insect eaten cavities; cleaning of the painted surface and colour reintegration. Finally on the conserved panels, a protective coat of picture varnish was applied on the painted surface.

25. SE'CATHEDRAL CHURCH, VELHA GOA, GOA

The chemical conservation work of wooden panel paintings, gilded wooden carvings and polychrome sculptures of this altar was continued. The main conservation measures involved strengthening of wooden panels by filling the cavities caused as a result of insect attack, removal of accretionary deposits from the painted surface and finally the application of fresh preservative coating on the painted surface.

Since insect activity was observed to be the major factor for damage and deterioration of objects made of wood, the fumigation work of Blessed sacrament and sacristy room of this church was undertaken to protect the gilded wooden altars, wooden sculptures, finely carved wooden structures and paintings. The fumigation was carried out using ethoxide gas in the closed chamber for a period of thirty-six hours to ensure the chambers absolutely insect free.

26. ST.. FRANSIS ASSISI CHURCH, VELHA GOA, GOA

The chemical conservation work of a canvas painting of the choir room of this church depicting the St. Fransis Assisi praying in the church of St.

Dominica in front of Jesus was undertaken. This painting exhibited on top of the western wall of choir room was observed to have been affected due to high humidity and also torn on the edges. The supporting wooden panels at the back were damaged by insect activity and after the removal of supporting planks, it was observed that the old relining of canvas had lot only peeled off at several places but also affected by white ants.

After general cleaning of this painting, it was removed from the stretcher and after removing the old damaged relining, it was relined with a new canvas support using hot molten wax resin mixture. The painted surface was again subjected to chemical cleaning after removing the. facing and colour reintegration also attended to after fixing it on the repaired stretch.

GUJARAT

27. RAO LAKHA CHHATTRI, BHUJ, DISTRICT BHUJ

The sculptures and carvings of this monument covered with accretionary deposits of dust, dirt, bird's excreta and biological growth were subjected to chemical treatment followed by fungicidal treatment and water repellent coating.

28. MAHADEV TEMPLE, BAVKA, DISTRICT DAHOD

This temple was affected badly due to earthquake. This temple was covered with deposits of micro-vegetational growth, dust, dirt and bird's excreta. The chemical treatment work was carried out using mixture of ammonia and teepol solution. Since the chemical treatment work on this monument was taken up for the first time, at some places the treatment had to be repeated for the removal of adherent accretionary deposits. The chemically cleaned surface was given fungicidal treatment using 3-4% suspension of zinc silicofluoride and finally on the dried stone surface a preservative coating of 3% solution of PMMA in toluene was applied.

29. KEVDA MASJID, PAVAGADH, DISTRICT GODHRA

The chemical conservation work on this monument was taken up for the removal of accretionary deposits of smoke, dust, dirt, bird's excreta and lime-wash at some portions. After the general chemical treatment with aqueous solution of ammonia and teepol, the lime-wash accretionary deposits were removed using dilute acetic acid and thoroughly washed with water. The chemically cleaned surface was given fungicidal treatment followed by water repellent coat of 2% solution of PMMA in toluene.

30. NAGINA MASJID, PAVAGADH, DISTRICT GODHRA

The chemical treatment work on this monument was continued during the year for the removal of biological accretionary deposits as well as bird's excreta using 3% ammonia solution. The lime-wash deposition at some places was removed using dilute acetic acid whereas deposits of soot and other tarry matters were removed with the help of organic solvents. The chemically cleaned-surface was given fungicidal treatment followed by application of protective coating of 3% solution of PMMA in toluene on the dried surface.

31. GALTESHVARA TEMPLE, SARNAL, DISTRICT KHEDA

The accretionary deposits of dust, dirt and biological growth on the carvings and sculptures of this monument located on the bank of Mahi river, were removed by chemical treatment and applications of

fungicidal as well as preservative coatings were also carried out.

32. SUN TEMPLE, MODHERA, DISTRICT MAHESANA

In continuation of the last year's *(1999-2000,* p. 346) work, the chemical conservation for the removal of accretionary deposits from the sculptures and carvings on the exterior part of the monument was carried out. The cleaned area was given fungicidal treatment and water repellent protective coatings with 3% aqueous solution of potassium methyl siliconate followed by 2% solution of PMMA in toluene after a gap of two weeks on the dried surface as a double component system.

33. NEELKANTHESVARA MAHADEV TEMPLE, SUNAK, DISTRICT PATAN

The chemical treatment work on this remotely located but beautifully carved monument was taken up for the first time. The carvings and sculptures were covered with thick biological growth and other accretionary deposits as a result the details of exquisite carvings were hardly visible. The chemical cleaning was carried out using ammonia-teepol solution followed by fungicidal treatment and finally two coats of 1 % solution of PMMA in toluene were applied.

34. PAINTINGS OF TAMBEKERWADA, VADODARA, DISTRICT VADODARA

The painted canvas of ceiling at second floor of this monument was observed to have suffered tearing and separation from the ceiling. The chemical conservation work was taken up for general cleaning of the painted canvas, its repair and re-fixing in position. Minor retouching work was also attended to.

HIMACHAL PRADESH

35. NARBADESVARA TEMPLE, SUJANPUR TIRA, DISTRICT HAMIRPUR

In continuation of the last year's *(1999-2000,* p. 347) work, the chemical conservation work was taken up on the surrounding structures and walls for the removal of thick layers of micro-vegetational growth and other accretions as well using dilute solution of ammonia and teepol. After thorough washing of the chemically cleaned-surface, 2% solution of sodium pentachlorophenate was sprayed and finally on the dried surface two coats of 2% solution of PMMA in toluene were applied as water repellent.

36. SIVA TEMPLE, BAIJNATH, DISTRICT, KANGRA

The outer portion of the *sikhara* and *mandapa* of the main temple were affected with micro-vegetational growth like moss, lichen and small plants as well. The stone figures of deities placed in nitches all around the temple and *mandapa* were mainly affected due to greasy dust deposits as the devotees pour milk and other such material on these idols as religious rituals.

The inner portion of the *mandapa,* ante-room and sanctum-sanctorum having elaborately carved, floral and geometrical design and also figures of deities were covered with thick layers of soot deposit due to burning of oil, *ghee,* lamps and incense sticks being in worship. At some places inside the *mandapa,* coats of whitewash were also observed.

The chemical cleaning work was taken up on the outer as well as inner portion of the temple. Initially, the superficial accretionary deposits were removed with soft nylon brushes. Thereafter, chemi-

cal cleaning treatment was carried out using a mixture of liquor ammonia and non-ionic detergent with mild brushing. At some areas, the chemical treatment had to be repeated 2-3 times for the complete eradication of accretionary deposits. After thorough washing, the fungicidal treatment and application of water repellent coating on the dried surface were carried out.

The chemical conservation work on subsidiary temple and surrounding walls was also carried out mainly for the removal of micro-vegetational growth. The entire temple-complex was chemically treated and conserved.

37. Di WANG GOMPHA, TABO, DISTRICT LAHAUL AND SPITI

Duwang Gompha is one of the oldest and most important Gomphas in the Tabo Monastery-complex. It was observed that time bearing stresses and strains and natural calamities proved very harmful to the painted wall, which developed vertical as well as zig-zag cracks running through the painted surface and at many places the painted surface was bulged out. Besides, lots of dust had deposited on the painted surface as well as on the stucco figures fixed in the wall. The stucco figures were also observed to have suffered damage in the form of cracks, loss of some parts and also in some cases had loosened their grip from the wall.

During the year under review, superficial dust and dirt from the painted surface and stucco figures by soft hair brushes were removed besides partial chemical cleaning of the mural paintings and figures using mixture of different organic solvents like methanol, cellosolve, petroleum ether etc.; filling up of cracks and repairing of missing portions of the stucco figures and colour matching of the repaired and filleted areas.

JAMMU & KASHMIR

38. SHEESH MAHAL & RANG MAHAL, RAM NAGAR, DISTRICT UDHAMPUR

The paintings on the walls of Sheesh Mahal and Rang Mahal depicting geometrical, floral designs and scenes of mythological panels were affected due to seepage of water and dampness in the walls. As a result, at many places the pigments, colours etc. were lost. The chemical conservation work was carried out for the removal of dust, dirt and other accretionary deposits using different organic solvents like methanol, carbon tetrachloride etc. The chemically cleaned painted surface was given 2-3 coats of 0.5% PVA solution in toluene so as to consolidate pigments and preserve chemically cleaned areas.

KARNATAKA

39. HAZARA RAMACHANDRA TEMPLE, HAMPI DISTRICT BELLARY

The chemical treatment and preservation work for eradication of micro-vegetational growth, lime-wash accretions etc. was continued during the year under review. The micro-vegetational growth was eradicated using mixture of ammonia and non-ionic detergent, whereas lime-wash and calcarious accretionary deposits were removed using dilute glacial acetic acid and sodium hexametaphosphate. Finally, the stone surface was treated with sodium pentachlorophenate as fungicide followed by preservation with PMMA in toluene on the dried surface.

40. DARIA DAULAT BAGH, SRIRANGPATNA, DISTRICT MANDYA

The chemical conservation work for consolidating the friable pigments and rendering as well as chemical cleaning of the paintings on the ceiling and

walls of the northern varandah and north-east and north-west anti-chambers was continued. The chemical cleaning of the paintings was taken up for the removal of superficial accretions and old translucent preservative coat using organic solvents like 2-Ethoxy ethanol, methanol, turpentine and toluene. The consolidated areas were reintegrated for colour matching and the conserved area was preserved with a very thin coat of PVA solution.

The joints of wooden panels of the ceiling covered with thin strips of canvas which act as carrier for paintings were found damaged and at some places the canvas strips were missing or detached and hanging. These missing canvas strips were replaced and the detached and hanging ones were re-fixed and properly reintegrated.

41. RANGANATHASVAMY TEMPLE, SRIRANGAPATNA, DISTRICT MANDYA

In continuation of the previous year's *(1999-2000,* p. 349) work, the sculptures and carvings in the entrance *mandapa* (interior and exterior), the tower of small shrines in the outer circumambulatory passage were subjected to chemical treatment for the removal of micro-vegetational growth, oily strains, soot and lime-coats. The chemicals used were aqueous solution of liquor ammonia, non-ionic detergent and glacial acetic acid. Finally, the treated area was preserved with 1% solution of Acrypol P 876 in toluene. The work is in progress.

42. SRIKANTESVARA TEMPLE, NVNJANGUD, DISTRICT MYSORE

The chemical treatment work was initiated for the removal of lime-coats from the sculptures and carvings in the portrait *mantapa* on three sides and western tower (interior and exterior) using glacial acetic acid followed by washing with liquor ammonia and non-ionic detergent. The work is in progress.

43. TIPU SULTAN'S MAUSOLEUM, GUMBAZ SRIRANGAPATNA, DISTRICT MANDYA

The chemical treatment work for the removal of old yellowish translucent varnish coat from the painted surface on the walls, dome and door-jambs of the interior of the monument was continued using 2-ethoxy ethanol and turpentine as re-strainer. The consolidation of the rendering in the form of filling the lacunae, colour reintegration of filled in lacunae was also attended to and finally a very dilute solution of clear picture varnish was applied on the chemically conserved areas.

KERALA

44. MURAL PAINTINGS IN MATTANCHERRY PALACE MUSEUM, COCHIN

The mural paintings in different locations of the museum were chemically treated for the removal of dust, dirt, oily and sooty accretions using organic solvents like di acetone alcohol, 2-ethoxy ethanol, morpholine, toluene and turpentine. Filleting at some places was carried out to stabilize the painted surface and selective colour matching of the filleted areas as well at other locations was also attended to.

45. SIVA TEMPLE, THIRUVANJIKULAM, DISTRICT THRISSUR

The oily and sooty accretions deposited on the paintings as well as on wood carvings were removed using organic solvents like, toluene, di acetone alcohol, butyl lactate, tri ethanol amine, iso propyl alcohol and methanol. Flytox (Pyrethrum extract) was applied as insecticide on wooden carvings and 1.5% solution of PVA in toluene was applied as preservative on paintings and wood carvings.

The red and black paint marks on the granite stone sculptures were also removed using acetone.

Plates 239-240



239



240

Devi Jagadambi Temple, Khajuraho: 239, *before* and 240, *after chemical conservation*

benzene as well as sodium hydroxide, ammonia solution in different steps. 3% polymethylmethacrylate in toluene was applied as preservative.

MADHYA PRADESH

46. CHATURBHUJA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

In continuation of the previous year's *(1998-1999,* p. 349) work, conservation work on the exterior walls of the temple remained in progress and during the year south-east facing walls were taken up for chemical treatment and conservation work. The scope of the work included chemical cleaning for removal of dust and din, lime and micro flora, consolidation of the fragile stones, application of biocides and protective coatings. The work was completed.

47. CHITRAGUPTA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

After successfully completing the chemical conservation of the exterior walls of the main temple in the previous years, its platform and terrace wall were subjected to chemical treatment and preservation work for the eradication of cryptogams such as moss, lichen and algae from sandstone surfaces. The work was completed.

48. JAGDAMBA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

After having completed the chemical conservation of exterior walls of the main temple in the previous years, its platform and terraces were subjected to chemical treatment and preservation work, for the eradication of cryptogams such as moss, lichen and algae from sandstone surfaces. The work is in progress (pls. 239-240).

49. KANDARIYA MAHADEV TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

The chemical conservation work of its restored platform, terrace wall with carvings and sculptures was continued and completed during the year under review. Various measures were undertaken to chemically clean the accumulation of dust and dirt, micro flora, application of biocides and finally, a water repellent silicon resin coat was applied to the entire cleaned and treated surface of the wall.

50. LAKSHMANA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

The chemical conservation work for its subsidiary shrines and platform terrace wall decorated with unique friezes and carvings made of sandstone, was continued during the year and completed. The scope of the work undertaken included chemical cleaning for removal of dust, dirt and micro flora using dilute mixture of ammonia and teepol. repairing and tilling up of cracks and gaps in the carved stone slabs, consolidation of the fragile stones, application of biocides and protective coatings on the chemically cleaned stone surface.

51. VARAHA, NANDI AND MAHADEV SHRINES, KHAJURAHO, DISTRICT CHHATTARPUR

In continuation of the previous year's (*1998-1999,* p. 350) work, the chemical conservation of these smaller shrines in the western group remained in progress during the year. About 50% of the estimated work was completed.

52. VISHVANATHA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR

In continuation of the previous year's *(1998-1999,* p. 350) work, the chemical conservation work on exterior sanctum walls and *sikhara* of the main

Plates 241-242



241



242

Siva Temple, Nohata: 241, *before* and 242, *after chemical conservation*

temple, remained in progress during the year. The chemical cleaning, fungicidal treatment and application of water repellent coating in sequence were taken up on the north-west facing walls and the work was completed.

53. SIVA TEMPLE, NOHATA, DISTRICT DAMOH

The chemical treatment work for the eradication of thick micro-biological growth and removal of lime-wash coating from the exterior as well as the interior walls of the temple was continued during this year as well. After the chemical treatment, the original features and details of sculptures and carvings were properly exposed. The cleaned surfaces were given fungicidal treatment followed by surface protected coating of water repellent. In some area, the deep wide cracks in the carved figures were also filled-in with smooth finish using mortar of epoxy resin and rock powder. The work was completed (pi. 241-242).

54. RAJA BIR SIGH DEO PALACE, DATIA, DISTRICT DATIA

The chemical conservation work for the removal of accretionary deposits from the painted surface of the Maharani's make up room located at the fourth floor was undertaken. Besides, the fixing and filleting of the loose and damaged painted plasters was also attended to. The chemically cleaned and consolidated painted surface was finally given a very thin coat of preservative so as to consolidate the pigments as well.

55. ROCK-CIT CAVES, *BACH,* DISTRICT DHAR

Confronted with the challenging task of restoring the unique but crumbling rock-cut figures in the vestibule chamber of Cave 2, it was thought prudent to go in for making moulds of the original relief figures from which reproductions could be obtained. As a part of this decision and strategy to replace the damaged original figures by reproductions at a later date when the situation warrants, the work of making the reproduction of the central Buddha figure, almost 10'4" high, 4' wide and 1 '6" thick carved on west wall of the vestibule was successfully completed. The details of the original figures were reproduced with accuracy by using rubber in liquid form as moulding material.

In the moulding process, the first step involved was the application of a thin coat of polyurethane (Thermo plastic polymer) synthetic clear varnish as a separating agent for the moulding material. The single skin rubber mould comprising at least twenty thin layers of rubber applied in liquid form was obtained by spreading technique. The rubber mould so produced was found to be lighter in weight and could easily be peeled off from the original sculptures without any damage to it. The next step was to prepare a rigid support or a mother mould of fibre glass reinforced resin. Since rubber being a flexible material requires a mother mould to remain in shape during use and in storage, the mother mould had to be prepared in several separate sections covering the entire surface of the figure because of its details and under cuts.

For casting, the main raw materials used were resin UP/MI21 (an orthopthalic acid based polyester resin), cobalt Octoate as catalyst, methyl ethyl ketone per oxide as hardener, chopped fibre glass strand matting as reinforcement material. Waxpol or poly vinyl alcohol as a separating agent. Gelcoat and steel rods for reinforcement. Finally, the finished cast made in fibre glass reinforced resin was affixed to a polished *sal* wood frame for erection and display.

56. TOMB OF MOHAMMAD GHAUS, GWALIOR, DISTRICT GWALIOR,

In continuation of the previous year's *(1998-1999,* p. 353) work, the chemical treatment and preservation work of sandstone perforated screens with exquisite lattice design of this tomb was continued and completed. The sticky and brown black hard crust on the sandstone caused by deposits of solid particles and soiling materials was eliminated by physico-chemical process using ammonia solution (2%) and Extran MA02 (a non-ionic detergent) in distilled water. After cleaning was over, the entire surface was subjected to fungicidal treatment followed by application of PMMA (2%) solution in toluene as protective coating.

57. Sri PA No. 2, SANCHI, DISTRICT RAISEN

The sandstone blocks in the balustrade which show signs of extensive decay attributable to biological agents and other natural weathering agencies pose the greatest and perpetual problem for conservation. Due to a heavy algal growth, stains of various shades from green to almost black on different areas were observed. Grey or black crusts formed due to lichens on the sandstone carved surface of the monument, besides, surface erosion, causing deep vertical cracks thus directly affecting the relief figures. During the year, cleaning work of the dome using soft brushes dampened in a weak solution of ammonia and Rank (a neutral non-ionic detergent) was carried out. The work is still in progress.

58. NEELKANTHESVARA MAHADEV TEMPLE, UDAIPIR, DISTRICT VIDISHA

The sandstone blocks of the monument, found to be badly affected by a heavy growth of cryptogams such as moss, lichen and algae obliterating thereby the details of the sculpture and carvings which adorn its exterior walls. Besides, the sculptural surface was also found covered with dust and dirt, bird droppings and other extraneous depositions thus spoiling monument's aesthetic look. The preservative treatment carried out during the year on the upper roof portion of the main hall consisted of physico-chemical cleaning using ammonia solution (1-5% depending upon the severity of the growth) mixed with Cedepol (a non-ionic neutral detergent) for the complete elimination of micro flora deposition from sandstone surfaces. The work is still in progress.

MAHARASHTRA

59. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD

To control the insect and pest activity within the painted caves, fumigation of the Caves. 16 and 17 was carried out with Ethoxide gas as a fumigant. The fumigant was allowed to remain in the air tight caves for thirty-six hours so as to ensure the maximum lethal action of the fumigant for eradication of various types of insects and harmful inhabitants such as silver fish, cockroaches, bats, rodents etc.

The insecticidal treatment as a regular measure twice a month by spraying 2% Pyrethrum extract in kerosene oil was carried out on the unpainted surface in the caves.

The chemical treatment work for the removal of accretionary deposits from the painted surface was carried out in Caves 2, 6, 17 and 21. In Cave 2 about 14 sq m painted surface on east aisle ceiling was subjected to chemical treatment for general cleaning and removal of soot and other accretions etc. using different organic solvents. Likewise, approximately 11 sq m area of painted surface on door-jamb of lower Cave 6; approximate 8 sq m on beam and pilaster in east and west aisle of Cave 17 and 48 sq

m area of panels 1 and 2 of Cave no. 21 were chemically treated for the removal of soot and accretions. After completion of chemical treatment a very dilute solution of PVA about 0.5% in toluene was applied on bone dry surface as a protective coat.

The main focus during the year was on the stabilization of the painted surface and the mud plaster with remains of some paintings. For this purpose, the consolidation of loose plaster and paintings, filling up of cracks, holes, fixing and bulging and filleting the edges were carried out in Caves 6, 17,20 and 21. For filleting purpose, 2% solution of PVA was applied on edges of the painted mud-plaster for consolidation and then the edges were filleted by using Plaster of Paris, fevicol emulsion and painted with suitable dry earth colours to tone down the patch. The bulged out surfaces were fixed by injecting solution of acrylic emulsion and fixing to the rendering or the support with required pressure. Unpainted mud-plaster was filleted by mixture of mud, gum and glue.

The removal of dust and dirt from sculptures and painted surface using feather brushes and sable hair brushes was carried out periodically throughout the year. Temperature and relative humidity were monitored regularly at some specific locations inside and outside the caves.

60. AURANGABAD, CAVE 3, DISTRICT AURANGABAD

The stone sculptures inside the Cave 3 were covered with a thick layer of dust, dirt and bird's excreta particularly bat's excreta. Several cracks were seen here and there. There were whitish marks due to dried patches of bat's excreta. The facade was affected due to thick growth of micro-vegetation, causing ugly look to the stone sculptures.

The chemical cleaning was carried out for removal of dust, dirt and micro-vegetation with 2-3% solution of ammonia and 1 % aqueous solution of non-ionic detergent and gentle brushing. The whitish spots removed by treatment with E.D.T.A. salt and ammonium bicarbonate and ammonia solution and gentle brushing followed by thorough washing. After cleaning, 2% aqueous solution of sodium pentachlorophenate was applied. The cracks and loose parts were filled up and consolidated with paste of rock powder of same texture prepared from the stone of the same monuments and acrylic emulsion. Finally, a 2% solution of PMMA in toluene was applied as preservative. The work was completed.

61. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD

The efforts were continued for the removal of hardened oil, soot, smoke, dust, dirt and bat's excreta from the painted surface in the shrine of first floor. Due to tenacious nature of accretions, the results were not encouraging, it was decided to stop further chemical treatment till the appropriate technique is developed.

In continuation of the last year's *{1998-1999,* pp. 356-357) work, the chemical treatment of lower hall's exterior stone sculpture of main Kailasa Temple was taken up. After dusting and consolidation of loose fragile sculpture/paintings, the general chemical cleaning of stone sculpture for the removal of micro-vegetational growth was carried out using mixture of 2-3% ammonia and 1 % non-ionic detergent with gentle brushing. The white calcareous deposits were subjected to treatment using dilute acetic acid with gentle brushing followed by neutralization with dilute ammonia and thorough washing. The chemically cleaned surface was subjected to fungicidal treatment with 2% solution of sodium pentachlorophenate followed by protective coating of 2% solution of PMMA on the dried surface.

Plates 243-244



243



244

Ekamresvara Temple, Lingaraja Temple-complex: 243, *before* and 244, *after chemical conservation.*

62. SHANIWARWADA, PUNE, DISTRICT PUNE

The chemical conservation work of back wall, wooden structures, plinth of the monument was taken up. Chemical cleaning of stone structure was carried out for the removal of dust, dirt, bat's excreta, thick growth of micro-vegetation using 2% aqueous ammonia and 1 % non-ionic detergent. White calcareous deposits and graffiti etc. were removed with 0.5% aqueous acetic acid followed by thorough washing with plenty of water. The cleaned surface was given fungicidal treatment with 2% solution of sodium pentachlorophenate followed by preservation with 3% solution of poly methylmethacrylate in toluene. The hollow joints of stone blocks were filled with lime-mortar loaded with polymer compound.

The wooden structures were subjected to chemical cleaning for the removal of old preservative layer and other accretions using a mixture of methanol, diacetone alcohol and ammonia. The cleaned dried wooden structures were preserved with 5% PMMA + 1% wood creosote in toluene after fungicidal treatment.

ORISSA

63. EKAMRESVARA TEMPLE, LINGARAJA TEMPLE-COMPLEX, DISTRICT BHUBANESWAR

The temple is situated in the complex of Lord Lingaraja Temple, Bhubaneswar of sandstone with fine exquisite carvings. The outer wall of the temple was covered with dust, dirt, moss and micro-vegetational growth etc.

The micro-vegetational growth, dust, dirt and other accretions were removed with a mixture of 2% ammonia solution and liquid non-ionic detergent. Black accretions were subjected to treatment with 5% oxalic acid solution. After cleaning, 2% solution of sodium pentachlorophenate was sprayed over the surface to arrest the micro-vegetational growth further. Finally, over the dried surface, 1:30 aqueous solution of potassium methyl siliconate which is water based preservative with high penetration power was applied. After a gap of seven days, 1.5% solution of PMMA in toluene was applied, as a final coat. The work was completed during the year (pls. 243-244).

64. PERIPHERY WALL AND BIG STUPAS, RATNAGIRI MONASTERY, RATNAGIRI, DISTRICT JAJPUR

Ratnagiri monastery, containing many small and big stupas, beautiful loose sculptures surrounded by a periphery wall with a beautifully carved chlorite stone door-jamb. The sculptures and walls were covered with thick coat of vegetational growth, moss, lichen etc. and other superficial accretions. The chemical cleaning was carried out using 2% liquid ammonia solution mixed with non-ionic detergent with soft brushing. After thorough washing, 2% sodium pentachlorophenate was applied as a fungicide coat on the dried surface, a coat of Repellin super solution (1:30) diluted in distilled water was applied as initial water repellent coat. After a period of one week, another coat of 1.5% PMMA solution in toluene was applied, which brings back the aesthetic view of the monastery. The work was completed.

65. DAKSHYA PRAJAPATI TEMPLE, BANPUR, DISTRICT PURI

Dakshya Prajapati Temple situated near Chilka lake and about 100 km from Bhubaneswar, consists of four parts Vimana, Jagamohana, Bhog-mandapa, Nata-mandapa with a compound wall and gate in the eastern side. Vimana and Jagamohana are made of sandstone whereas Bhoga-mandapa and Nata-mandapa have plastered-surface. The other sub-shrines within the complex are Budhi Maa Temple,

Budhalinga and Hanuman Temple also with plastered surface and a faint coat of red paint. As the temple-complex is situated in the heavy rainfall area with high humidity, the temples were covered with thick vegetational growth, moss, lichen, dust, dirt and pigeon drops etc. along with un-homogenous dark black accretions.

After superficial dusting, the micro-vegetational growth, moss, lichen, dust, dirt and pigeon drops were removed using 2-3% ammonia solution mixed with non-ionic detergent. The black accretions were removed with 2-4% oxalic acid solution.

66. CHHAYADEVI AND MAYADEVI TEMPLES, SUN TEMPLE-COMPLEX, KONARAK, DISTRICT PURI

Both the Chhayadevi and Mayadevi Temples are within the Sun Temple-complex, consisting of two parts each, Vimana and Jagamohana. Chhayadevi Temple is made up of Khandolite stone and Mayadevi Temple is of brick structure. Both the outer and inner walls of the temples were covered with micro-vegetational growth, dust and dirt. During the year chemical conservation of Chhayadevi Temple was taken up.

The micro-vegetational growth, dust, dirt etc., were removed by 2% aqueous solution of ammonia mixed with non-ionic detergent. Dark black accretions some on outer wall of Vimana and Jagamohana, but maximum on the inner wall of Jagamohana were treated with 2-4% aqueous oxalic acid. Over the cleaned-surface, 2% aqueous solution of sodium pentachlorophenate was sprayed as a fungicidal treatment. Finally, one coat of 1:30 aqueous potassium methyl siliconate solution followed by 1.5% PMMA solution in toluene as preservative coat was applied over the dried stone surface maintaining a gap of seven days between the two coats to get the maximum penetration of the former preservative within the stone surface. About 80% of work was completed.

67. SURYANARAYANA TEMPLE, LORD JAGANNATHA TEMPLE COMPLEX, PURI, DISTRICT PURI

More than a decade back, the temple was deplastered, chemically treated and preserved. Only the top portion of Bhoga-mandapa, the stones of which are lateritic in nature were again plastered and a red colour paint was applied over the surface. The temple was covered with micro-vegetational growth along with dust, dirt and soot. Due to saline, salt deposition was found maximum on south side and top of the Vimana.

The micro-vegetational growth and dirt were removed using 2% aqueous solution of ammonia mixed with liquid non-ionic detergent. Salt deposition was removed by repeated paper pulp treatment. Some dark black accretion (maximum on north side of Vimana) was treated with 2-4% oxalic acid solution. For fungicidal treatment, 2% aqueous sodium pentachlorophenate solution was sprayed over the cleaned surface. Finally, 1:30 aqueous Repellin super (potassium methyl siliconate) was applied followed by 1.5% PMMA in toluene as preservative coat over the stone surface only. The gap between two coats was seven days. For the plastered surface a single coat of 2% PMMA solution was applied.

68. NATAMANDAPA, SUN TEMPLE-COMPLEX, KONARAK, DISTRICT PURI

Nata-mandapa within the Sun temple-complex, elaborately carved with pillars situated in the east of Jagamohana, is affected due to its close proximity to the sea with the effects of saline along with vegetational growth, dust and dirt.

Plates 245-246



245



246

Gopinath Temple, Bhangarh: 245, before and 246, after chemical conservation

The deposition of salt within the pores of the stone was removed by repeated paper pulp treatment. Micro-vegetational growth, dust and dirt were removed by 2% aqueous ammonia solution and non-ionic liquid detergent. Over the cleaned surface, 2% aqueous sodium pentachlorophenate was sprayed to arrest the micro-vegetational growth further. Over the dried surface, 1:30 aqueous potassium methyl siliconate solution was applied followed by a coat of 1.5% PMMA after seven days. About 30% of the work was completed.

RAJASTHAN

69. GOPINATH TEMPLE, BHANGARH, GOLA-KA-BAS, DISTRICT ALWAR

The chemical cleaning work was taken up on the exterior surface of the main *sikhara* and *mandapa* of Gopinath Temple for eradication of thick growth of biological accretions, lime-coatings and dust, dirt etc. from the beautiful carvings and designs. 3-5% ammonical solution was used for removal of biological accretions and lime-wash was removed by chemico-mechanical means using 1 % acetic acid solution followed by thorough washing with plenty of water. To prevent further biological re-growth, the stone surface was treated with fungicide using 2% solution of sodium pentachlorophenate. Finally, the treated stone surface was preserved with an application of 2 coats of 1% solution of polymethylmethacrylate in toluene. The work was completed (pls. 245-246).

70. LOOSE SCULPTURES IN NILAKANTHA MAHADEV TEMPLE, NEELKANTH, TAHALA, DISTRICT ALWAR

The work of chemical treatment was undertaken for the removal of thick biological growth, dust, dirt, bacterial slime and lime-wash from five hundred loose sculptures. 3-5% ammonical water admixed with non-ionic liquid detergent was used to remove biological accretions and 1 % solution of acetic acid for removal of lime-wash. The chemically treated surface was thoroughly washed with plenty of water. The cleaned-surface was subjected to fungicidal treatment with sodium pentachlorophenate solution followed by preservation with Repellin super in appropriate concentration and 1% solution of PMMA in toluene, using double component system.

71. SOMESVARA MAHADEV TEMPLE, BHANGARH, GOLA-KA-BAS, DISTRICT ALWAR

The work of chemical treatment and preservation was continued on the temple. The vegetational growth of dried moss, lichen and other accretions was removed using a solution of 3-5% liquid ammonia mixed with liquid non-ionic detergent in water and gentle brushing with soft nylon brushes. After ensuring complete eradication of accretionary deposits, the whole surface was sprayed with 2% solution of sodium pentachlorophenate in water to prevent early re-growth of vegetation. Finally, the surface was preserved with two coats of 1% solution of polymethylmethacrylate in toluene. The work was completed.

72. MAHAKALA TEMPLE;, BIJOLIA, , DISTRICT BHILWARA

The work of chemical treatment and preservation was continued for the removal of biological growth, dust, dirt, bacterial slime and lime-wash from the main *sikhara* I and II of Mahakala Temple, Bijolia. A mixture of 2-3% liquid ammonia and 1% non-ionic liquid detergent in water was used for eradication of lime-wash using chemico-mechanical method. The cleaned surface was given fungicidal treatment with sodium pentachlorophenate solution followed by preservation with 2 coats of 1% PMMA.

Plate 247-248



247



248

Mahakala Temple, Bijolia; 247, before and 248, after chemical conservation

Plates 249-250



249



250

Chitrashala, Bundi: 249, before and 250, after chemical treatment of wall painting

Plate 251-252



251



252

Kukresvara Mahadev Temple, Chittaugarh fort: 251, *before and* 252, *after chemical conservation*

In addition to the main *sikhara,* the *mandapa* and *ardha-mandapa* of Mahakala Temple were also chemically treated for the removal of accretions of micro-vegetation, dust, dirt and bacterial slime and lime-coats. The work on the *mandapas* will be continued further (pls. 247-248).

73. Wall Paintings, Chitrashala, Bundi, District Bundi

The work of chemical treatment and preservation of wall paintings of Chitrashala at Bundi was undertaken. The beautiful paintings covered with dust, dirt and other accretions appeared dull due to darkening of old preservatives. The superficial dust, dirt were removed gently by brushing with soft sable hair brushes. For the removal of old darkened preservative, mixtures of various organic solvents in suitable proportions were used. The cracks were filled up and loose portions were consolidated using Plaster of Paris and PVA emulsion. After chemical cleaning and consolidation, colour re-integration was done to have the uniformity and proper colour matching. Finally, the murals were preserved by application of 1% coat of polyvinyl acetate solution in toluene. During the year 13% work was completed (pls. 249-250).

74. Chittaurgarh Fort, District Chittaurgarh

The beautiful sculptures and carvings in the Digambar Jaina Temple, near Kirti Stambha, under thick biological growth, dust and dirt were subjected to chemical treatment using mixture of 3-5% solution of liquid ammonia and 1% non-ionic liquid detergent. After thoroughly washing the cleaned surface, fungicidal treatment using 2% solution of sodium pentachlorophenate in water was given. Finally, after drying, the surface was preserved with Repellin super (potassium methyl siliconate) in suitable concentration and 1% solution of PMMA in toluene in double component system.

In Kukreshvara Mahadev Temple the chemical cleaning work was started on exterior surface of the temple for the removal of moss, lichen, dust, dirt, bacterial slime and thick hard lime-coats from the stone surface and beautiful sculptures and carvings. Biological accretions were removed using 3-5% liquid ammonia admixed with non-ionic liquid detergent in water and gentle brushing with soft nylon brushes. Thick and hard lime- coating was removed by chemico-mechanical method using 1-2% solution of acetic acid. Accretions from deep carvings and sculptures were removed with utmost care to save the delicate carvings. The entire surface was thoroughly washed with plenty of clean water.

On treated and dried surface, fungicidal treatment was carried out using 2% solution of sodium pentachlorophenate solution and again left for sometime in order to dry the surface completely. Finally, completely dried surface was preserved using double component system (pls. 251-252).



75. Shore Temple, Mahabalipuram, District Kanchipuram

The chemical conservation work for the extraction of soluble salts from Sri Jalasayanaperumal shrine and inside the *prakara* walls of main shrine was taken up. Initially, the superficial dust, dirt, etc., were removed by chemical treatment using ammonia and teepol solution. The paper pulp treatment was carried out in 4-5 applications and in each application the paper pulp thoroughly washed with distilled water was applied on the chemically cleaned-surface and allowed to remain in position till completely dried and

developing cracks within its layer. After drying, it was removed and again washed with distilled water. The salt free surface was given fungicidal treatment with 2-3% solution of sodium pentachlorophenate and finally a coat of 3% PMMA in toluene was applied over the dried surface.

76. SRI MURUGANATHASVAMY TEMPLE, THIRUMURUGANPONDY , DISTRICT COIMBATORE

The chemical treatment for the removal of synthetic enamel grey coloured paint applied on the Vimanas of Siva, Amman, Subramaniam and Nandi was carried out using dilute solution of sodium hydroxide and by thorough washing with water. The thick deposits of soot, lime-wash as well as vegetational growth were also removed by chemical treatment. The chemically treated areas on the exterior portion were given fungicidal treatment using 1-2% aqueous solution of sodium pentachlorophenate solution and finally preserved with 2% PMMA in toluene.

77. GOPURAM BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR

During the year under review, the chemical conservation work was undertaken on the four sub-shrines and one Gopuram (Rajaraja). The micro-vegetational growth over the stucco figures on the Vimanas and Gopurams was chemically removed in two step treatment, initially using ammonia teepol mixture with very soft brushes and then slurry of calcium oxychloride. The chemically treated surfaces were given fungicidal treatment and preserved with double component system using Repellin super and 3% PMMA in toluene.

78. SVAYAMBHUNATHASVAMY TEMPLE, KILPUTHUR, DISTRICT THIRUVANNAMALAI

The interior and exterior walls, ceiling and pillars were subjected to chemical treatment for the removal of oily and sooty deposits as well as micro-vegetational growth using solution of ammonia and teepol in the ratio of 3:1. The chemically cleaned surface was given fungicidal treatment and application of a preservative coat.

79. SRIPATTABI RAMASVAMY TEMPLE, NARASINGARAYANPETTAI, DISTRICT VILLUPURAM

The walls and sculptures of the temple were subjected to chemical treatment for the removal of vegetational growth, dust, dirt and lime-wash using 3:1 aqueous solution of ammonia and teepol and 5% solution of acetic acid for lime-wash respectively followed by washing with water. Sodium pentachlorophenate (1.5% solution) was applied as fungicide followed by preservative coating of 3% solution of PMMA in toluene.

UTTAR PRADESH

80. AGRA FORT, AGRA, DISTRICT AGRA

The lime-plastered *burjies* and sandstone surface of the front face of Delhi Gate covered with micro-vegetational growth was subjected to chemical treatment using ammonia and teepol solution. The chemically cleaned-surface was given fungicidal and water repellent treatment using 1% solution of Repellin super in distilled water. The work is in progress.

81. EAST, WEST AND SOUTHERN GATES, TAJ MAHAL, AGRA, DISTRICT AGRA

The walls and *chhajjas* around the forecourt covered with thick deposition of micro-vegetational growth like moss, algae and lichen along with the deposition of suspended particulate matter and other accretions were subjected to chemical treatment using

a mixture of ammonia and teepol in the ratio of 3:1 and brushing with soft nylon brushes. After the removal of accretionary deposits, the chemically cleaned surface was given fungicidal treatment using 3% solution of sodium pentachlorophenate followed by water repellent treatment using 1% Repellin super.

The marble dome of east and west *burji* at the forecourt and red sandstone dome and wall of Saheli Burj, outside the western gate were covered with thick deposition of micro-vegetational growth and bird's excreta along with suspended particulate matter and other accretions. The accretions on marble dome surface were removed by clay-pack technique using Fuller's earth through absorption method followed by brushing and washing with distilled water. The accretions on red sandstone surface were removed using suitable strength of ammonia and Extran, a non-ionic detergent and brushing with soft nylon brushes and followed by fungicidal treatment on red sandstone surface using 3% sodium pentachlorophenate. Finally, the dried sandstone surface was treated with 1 % Repellin super as consolidant and water repellent. The work was completed.

82. FATEHPUR SIKRI, DISTRICT AGRA

The entire stone and plastered surface of Buland Darwaza covered with thick layers of moss, lichen and algae was subjected to chemical treatment using suitable strength of ammonia and non-ionic detergent. On the chemically cleaned surface, fungicidal treatment was carried out using 2% solution of sodium pentachlorophenate and finally a protective coat was given with 1% solution of Repellin super in water and on the completely dried surface after a gap of one week, 2 coats of 2% solution of PMMA in toluene were applied.

The painted plaster of Buland Darwaza was chemically cleaned using mixture of mild organic solvents. Over the dried surface, a protective coat of 1% solution of Polyvinyl Acetate was applied.

Lime-plaster and stone surface of *burjies,* dome and walls of corridor of Dargah-complex were subjected to chemical treatment for the removal of thick growth of moss and lichen using 3% solution of ammonia and non-ionic detergent. The chemically cleaned surface was given fungicidal treatment with 2% solution of sodium pentachlorophenate followed by water repellent treatment using 1% solution of Repellin super. The work will be continued further.

83. PAINTINGS IN CENTRAL HALL, ITIMAD-UD-DAULLA, AGRA, DISTRICT AGRA

The painted surface in the central hall appeared dull due to dust, dirt, smoke, soot and other particulate matter were chemically cleaned using suitable mild organic solvents and their mixtures in proper proportions. After complete drying, the painted surface was given a protective coat of 1 % PVA solution in toluene.

Like-wise the exposed marble surface was also chemically cleaned using only organic solvents.

84. RAM BAGH, AGRA, DISTRICT AGRA

The painted plaster in four rooms and varandah at Ram Bagh which suffered damages by way of flaking and bulging at many places due to moisture and vandalism besides the deteriorated painted surface were chemically preserved by fixing the pigments and bulged-out plaster by injecting fixative. The exposed edges of the paintings were filleted with Plaster of Paris for stabilization of painted surface and the filleted area was suitably retouched to match the colour of the ground.

Plates 253-254



254



253

Excavated brass object, Kutwar: 253, *before* and 254, *after chemical conservation*

85. GROUP OF TEMPLES BAIJNATH, DISTRICT ALMORA

The stone surface of the group of temples at Baijnath with thick deposits of moss and lichen apart from dust and dirt were removed with suitable mixture of ammonia and teepol in water. After chemical treatment, the surface was given fungicidal treatment. It was followed by application of 1 % solution of Repellin super in distilled water. Finally, after a gap of about ten days, the surface was preserved with Perspex in toluene.

86. FORT WALK, JAUNPUR, DISTRICT JAUNPUR

The thick layer of micro-vegetation from the main gate on the western side of the Shahi Fort was removed by chemical treatment using 5% aqueous solution of ammonia with gentle scrubbing. The black patches were subjected to treatment with aqueous solution of Oxalic acid. The chemically cleaned area was given application of 5% solution of sodium pentachlorophenate followed by 2% solution of PMMA in toluene on the dried surface. The work was completed.

87. LAL KHAN TOMB, VARANASI, DISTRICT VARANASI

The vegetational growth and superficial accretions such as dirt, dust and greasy accretions were removed by applying 5% solution of aqueous ammonia and liquid detergent respectively with the help of gentle scrubbing with suitable nylon brushes. 5% aqueous solution of sodium pentachlorophenate as fungicide was sprayed and finally on the cleaned surface 2% aqueous solution of Repellin super was applied followed by application of 2% solution of polymethylmethacrylate in toluene on the completely dried surface after a gap of fortnight. The work was completed.

88. The Department of Archaeology, the Government of National Capital Territory of Delhi, carried out the chemical cleaning of complete structure and inside the Baghchi Tomb near Hole Number 4.

89. The external and interval chemical cleaning of the unknown Tomb, near Hole Number 14-16 (Within Delhi Golf course) was undertaken by the Department of Archaeology, the Government of National Capital Territory of Delhi, in addition to the retouching and chemical cleaning of paintings.

TREATMENT OF EXCAVATED[1] OBJECTS AND MUSEUM EXHIBITS

1. Museum objects in Mattancherry Palace Museum, Cochin, like headgears, silver and brass handle of palanquin, iron sword were chemically treated for the removal of surface accretionary deposits and then preserved.
2. Fifty coins of copper, iron and brass received from S.A., Vadodara Circle of the Survey, were chemically treated using suitable chemicals and preserved.
3. Thirteen metal objects comprising twelve coins and a brass object (broken in two pieces) received from the office of the S.A., Bhopal Circle of the Survey, obtained from Kutwar excavation were chemically cleaned and conserved (pls. 253-254).

CHEMICAL TREATMENT OF ANTIQUITIES IN THE ZONAL LABORATORY AT DELHI

Stone sculptures received from Central Antiquities Collection, Purana Qila, of the Survey, were chemically treated and preserved using suitable chemicals.

[1]Information from : Director (Science) of the Survey, Dehradun

5. Clay figurines received from excavated site of Rakhigarhi, District Hissar, Haryana, were chemically treated and preserved.

6. Seals received from the Institute of Archaeology, of the Survey, were chemically treated and preserved.

7. Stone pillars from the Central Antiquities Collection, Purana Qila, of the Survey, were chemically treated and preserved besides twenty four copper antiquities.

8. Thirty-three coins retrieved from the excavation at Bekal Fort received through the office of the SA, Thrissur Circle, Thrissur, of the Survey, were chemically treated and preserved using suitable chemicals and preservatives.

9. One hundred and fifty copper coins received from the office of the Director (Epigraphy), Mysore, of the Survey, were chemically treated and preserved.

10. Twenty-four coins received from the S.A., Bangalore Circle, Bangalore, of the Survey, from the excavated site of Kanaganahalli, District Gulbarga, were chemically treated and preserved.

11. Ninety-nine packets of coins retrieved from the excavations at Banavasi, District North Kanara and Sannati, District Gulbarga, received from the S.A., Bangalore Circle, Bangalore, of the Survey, were chemically treated and preserved using suitable chemicals and preservatives.

12. In continuation of the previous year's work {*1998-1999,* p.365), the de-acidification of estampages was carried out using alcoholic barium hydroxide solution. The estampages were mended and the edges were strengthened by strip lining. They were preserved with 1% PVA solution in toluene. The work is in progress.

13. Five manuscripts received from Rashtriya Indian Military College (RIMC), Dehradun, were subjected to de-acidification, fumigation etc. The stiffness, the kinks and folds were removed by gently pressing under mild hot pressure condition before the manuscripts were laminated.

14. A tiger skin received from RIMC, Dehradun, was chemically treated and fumigated for its preservation using suitable chemicals.

MONITORING OF AIR POLLUTION[1]

A. The Air Pollution Monitoring at Taj Mahal and other monuments, Agra, was monitoring the levels of air pollutants that may affect the marble of Taj Mahal, Agra such as Sulphur dioxide, Oxides of Nitrogen, suspended particulate matter, dust fall rate, and sulphation rate. These are being monitored by the Ambient Air Quality Monitoring Station at Taj Mahal, Agra The dust fall rate and sulphation rate were also monitored at Red Fort, Agra. Besides, monitoring of these pollutants, various meteorological parameters *viz.,* temperature relative humidity, wind speed, wind direction are also being monitored.

B. METEOROLOGICAL PARAMETERS.

(i) Wind speed and wind direction were measured with the help of wind monitor (WM-200). During the period under review, the Taj Mahal experienced light air to gentle breeze with a few exceptions of dust storms during summer. The wind direction during most of the time was observed to be from north-west.

[1]Information from : Director (Science) of the Survey, Dehradun

(ii) Variations in temperature and Relative Humidity are the important factors responsible for weathering action of building materials. These parameters also regulate the rate of reaction of various air pollutants with the building materials.

Agra falls under the tropical climate region experiencing large variations in temperature and relative humidity. These variations create stresses into the stone matrix which over a very long period may result into cracks or surface pulverization. During the period under review, large variation in temperature and humidity was recorded.

C. PHYSICAL PARAMETERS

(i) Dust fall rate

Dust particles act as carrier for various harmful constituents of the pollutants and are mainly responsible for abrasion of the stone surface. The dust fall rate was recorded in metric tonnes per sq km as maximum in July, 1999 and minimum in October, 1999. Volatile matter of dust fall was also estimated and recorded during the period.

(ii) Suspended participate matter

Fine dust floating for longer period is termed as suspended particulate matter (SPM) and gets deposited on the surface it impinges. The deposition of SPM on the stone surface is responsible for the soiling and yellowing of the marble surface. The level of SPM in the ambient air was measured using high volume sampler. The maximum concentration of SPM was measured as volume 1196 Mg/m3 during the month of December, 1999 (Average 429ug/m3) as against prescribed tolerable limit of l00ug/ m3.

D. CHEMICAL PARAMETERS

(i) Sulphur dioxide and Oxides of Nitrogen

Chemical!} active compounds which are acidic in nature are more lethal in their activity cause damage to any building stone. Sulphur dioxide and Nitrogen Oxide gases in particular are very harmful for the marble of Taj Mahal. It therefore, becomes very important to keep a close watch on the concentration of these gases in the ambient air. Maximum concentration of SO2 was calculated as 59ug/m3 during the month of December, 1999 (monthly average 16ug/m3). Minimum of 9.0 ug/m3 was recorded during February, 2000.

(ii) Sulphation rate

Sulphation rate plays vital role as this is the rate at which SO2 is converted into SO3 in the atmosphere which in turn is converted into Sulphuric Acid. This Sulphuric Acid is highly injurious to the marble surfaces. The sulphation rate was measured during the period by Lead candle method. The maximum sulphation rate was observed as 0.018 gm. SO3/m2/day in June, 1999 and minimum as 0.001 gm./m2/day during September, 1999.

E. AIR POLLUTION INDEX

1. Air Pollutant Index was calculated to study the cumulative effect of harmful pollutants during the period under review. This index was found to be 21 in case of ambient air quality as monitored at the Taj Mahal. The high value can be attributed to higher concentration of dust particulates in the ambience of Taj Mahal,

2. MONITORING OF AMOUNT AIR QUALITY AROUND CHARMINAR, HYDERABAD

Studies pertaining to monitoring of Suspended Particulate Matter levels are being continued.

3. MONITORING OF MICRO/MACRO CLIMATIC PARAMETERS AROUND GOMATESHVARA STATUE, SRAVANABEILAGOLA, DISTRIC T HASSAN

In order to study impact of air pollutants on the Gomateshvara Statue, various climatic parameters like temperature, humidity, wind speed, wind direction and rain fall were monitored during the period under review.

RESEARCH AND ANALYSIS[1]

(A) ANALYSIS

1. Eighty-seven soil samples received from the excavated site of Rakhigarhi, District Hissar (Haryana) were analyzed to find out its constituents.
2. A soil sample (no. 247) received from Rakhigarhi was analyzed to find out the percentage of total dissolved salts, identification of anions, acid insoluble, cation exchange capacity and percentage of copper by atomic absorption spectroscopy technique.
3. Sixteen metal samples received from Rakhigarhi were analyzed for its chemical composition by Spectrophotometric method.
4. Three metal samples received from Deeg Palace, Deeg. District Bharatpur (Rajasthan) were analyzed for its chemical constituents.
5. Two sandstone samples (red and white) received from Bhubaneshwar (Orissa) were studied for the identification of applied preservative layer with infra-red spectrophotometer.
6. Five soil samples from Humayun's Tomb Garden Complex, New Delhi, were analyzed for its chemical composition.
7. Three mortar samples from Humayun's Tomb, were analyzed for its constituents.
8. Seven coins received from the office of S.A. Jammu Circle, of the Survey (Jammu and Kashmir dynastic period) were chemically treated and preserved.

(B) RESEARCH

1. Detailed Scientific studies were carried out to evaluate the efficacy of some water repellents for hydrophobization of building materials.
2. Studies through literary survey was initiated to assess the relevance of laser cleaning in conservation of Indian monuments.
3. Studies on preservation of excavated iron artefacts with the use of inhibitors are in progress.
4. Studies were carried out to develop a traditional preservative/ protective coatings referred to as Vajralepa in the literature used on the stone surface of many monuments. Various observations were recorded and two pastes Vajralepa I and Vajralepa II were prepared with the available natural products according to literature.
5. Studies on conservation of ancient lime- plaster are in progress. Various observations and parameters were recorded.
6. Preliminary investigating studies were carried out for the water repellent Pidicote WRS from Pidilite to evaluate its behaviour for hydrophobization of stone surface.
7. Studies were carried out to explain the yellowing of different types of varnishes on the basis of literature in relation to the conservation of paintings.

[1]Information from : Director (Science) of the Survey. Dehradun

X. ARCHAEOLOGICAL GARDENS[1]

The Horticulture Branch, of the Survey, with five Horticulture Divisions located at Agra, Delhi, Mysore and Bhubaneswar is responsible for environmental development of centrally protected monuments through the language of nature, keeping in view the background of the monuments such as Temples, Churches, Mosques, Mausoleum, Cemeteries, Forts and Palaces etc. Horticulture Branch gives life and sole to the deserted memories of the past. In addition to the sites and monuments listed below, the Horticulture Branch is maintaining one hundred and fifty-nine archaeological gardens spread over the country in a presentable manner.

The activities carried out at various heritage sites in India during the year are detailed as under.

ANDHRA PRADESH

I. MONUMENTS AT ANUPU, DISTRICT GUNTUR

For developing and landscaping a garden around the monument, the uneven ground in the open areas was levelled alter pecking the ground, clearing all weeds and turning the soil. The lawns were then laid by proper landscaping.

2. GOLCONDA FORT, DISTRICT HYDERABAD

The areas between Aslah Khana and Rani Mahal-complex, clapping portico and Aslah Khana were levelled after pecking the ground, turning the soil and clearing all weeds followed by landscaping the area properly around the monument.

UTTAR PRADESH

3. CHINI-KA-RAUZA, AGRA

A befitting garden was developed around the monument.

4. DILKUSHA PALACE, LUCKNOW

During the period under report, the Horticulture Branch initiated the landscaping work in formal and informal style in line with the character of hunting lodge at Dilkusha Palace.

The Horticulture Branch of the Survey also undertook landscaping/environmental development, garden improvement works: besides, development of new sites. It remains an endeavour of Horticulture Branch to improve constantly the existing gardens by way of returfing/renovation of lawns, proper distribution of irrigation water for its judicious use, augmentation of irrigation arrangements by way of boring of additional borewells. Some sites where such programmes were taken up are as under.

5. DELHI

Regrassing/renovation of garden at Humayun's Tomb. Maqdum Shah Hauz Khas-complex. Feroz Shah Kotla. Sher Mandal. Kohina Masjid. Purana Qila, Khan-e-Khana Tomb, Nazaf Khan. Khairul Manazil, Salimgarh Fort are under improvement.

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[1] Information from : The Chief Horticulturist. Horticulture Branch of the Survey. Agra

6. GUJARAT

Regrassing of lawns at Sun Temple, Modhera; Shahar-ki-Masjid, Pawagarh and Hazira Tomb, Vadodara was completed.

7. KARNATAKA

Regrassing of lawns at D.D. Bagh, Srirangapatna; Mallikarjuna Temple, Pattadakal; laying out pipe line at Asar Mahal to Jamia Masjid, Bijapur; augmentation of irrigation at Laxmi Narayan Temple, Hosaholalu and sinking of borewell at Ibrahim Rouza. Bijapur was completed.

8. ORISSA

Renovation of old fencing, replacement of shrubbery and hedges at Sun Temple, Konarak were attended to.

9. RAJASTHAN

Landscaping in Hamir Palace, Ranthambore Fort, District Sawai Madhopur; Ashtadhatu Gate, Bharatpur Fort; Padmini Palace, Chittaurgarh; group of temples on the bank of River Chandrabhaga at Jhalrapatan was initiated.

10. TAMIL NADU

Regrassing of lawn at Brihadeshwara Temple, Thanjavur, was attended to.

11. UTTAR PRADESH

Laying out of pipe line at Mehtab Bagh; renovation of Khan-e-Alam Nursery, Agra; returfing of lawn at Chaukhandi Stupa, re-orientation of garden the Buddhist Sarnath Museum; Sarnath; construction deep tubewell at Stupa, Kushinagar; lifting of water from Gomti River to Shahi Fort, Jaunpur; boring of deep tube well at Kankali Tila, Mathura were attended to.

12. WEST BENGAL

Laying out pipe line at Cooch Behar Palace, Cooch Behar and regrassing of lawns at Rashmanch Temple, Shamrai Temple, Madan Mohan Temple, and Jor Bungla Temple, Bishnupur was initiated.

XI. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. Indian Archaeology-A Review

The issue for the year *1993-94* has been brought out.

2. Inventory of Centrally Protected Monuments

During the period under review, the *Inventory of Monuments and Sites of National Importance* (Vol. I, part 2), *Chandigarh Circle* was brought out.

3. Guide Books

Guide to Fatehpur Sikri (in Hindi) was brought out while guide to Nagarjunakonda (in English) has been reprinted.

4. Memoirs of the Archaeological Survey of India

During the period under review, thirty-one issues (Nos. 35, 42, 43, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62,63, 64, 65, 66, 67, 68, 69, 70, 71, 72, and 73) were taken up for reprinting.

5. Cunningham's Report

In this year Cunningham's Report - Vol. III. IV. VII, XIII, XVI, XVII, XVIII, XIX, XX and XXI were reprinted.

6. Special Publications

Two publications *viz.. Further excavations at Mohenjodaro.* Vol. I and II; *Revised lists of Antiquarian Remains in the Bombay Presidency,* Vol. VIII and *Excavation at Harappa,* being an account of Archaeological Excavation of Harappa carried out between 1920-21 and 1933-34 Vol. I and II were reprinted.

Other Publications

7. Haryana

The Department of Archaeology and Museums, Haryana published a booklet entitled *Archaeological wealth of Haryana,* a folder on *Bhima Devi Temple* and picture postcards on monuments/sculptures.



ARCHAEOLOGICAL SURVEY OF INDIA